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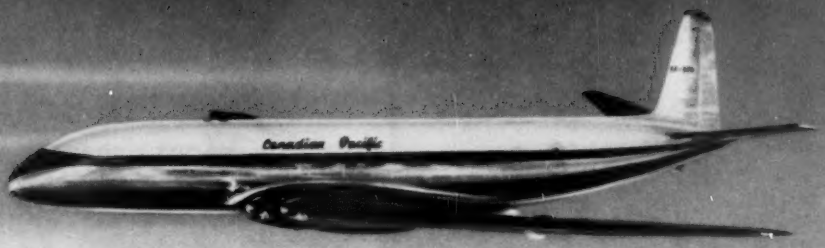

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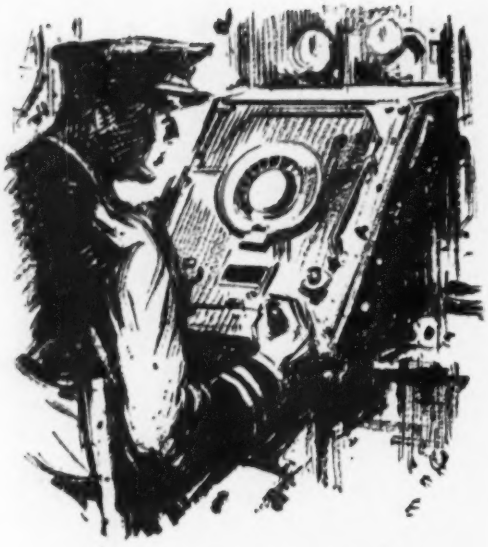

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Some of these developments were recently previewed by airline executives and military officials in a 3-day seminar held at Burbank. It was revealed that Lockheed (1) has a new Super Constellation cargo plane designed to reduce freight-carrying costs, and (2) has thoroughly analyzed the problems of loading, tying down, unloading and handling of freight at airports. One exhibit was Lockheed's mechanically operated scale model of "the ideal air cargo terminal," which has attracted national attention.

The new Super Constellation cargo plane is the most highly mechanized freight carrier yet designed. Some of its outstanding advantages:

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B.O.A.C. Earns the Nation's Gratitude

LAST week there took place an airline flight which was not only of profound personal significance to every loyal citizen throughout the British Commonwealth, but which will also live in the history of the Nation. We refer, of course, to the journey of the B.O.A.C. Argonaut *Atalanta* which brought Her Majesty Queen Elizabeth II so speedily and safely back to this country when the sudden death of her father the King called for her immediate accession to the throne.

The journey itself—a model of precision flying and a striking example of a first-class airline at work—constituted a magnificent demonstration of the efficiency of B.O.A.C.'s ground organization as well as of the unsurpassed skill of its flying crews. The aircraft was at Mombasa when the King died, yet within a few hours it had flown to Entebbe and was airborne for London with the Queen and her consort on board. The service, which involved immense responsibility for the Corporation, was laid on in an hour or two in all its complex aspects of flight-planning, refuelling arrangements, airport clearance, weather forecasting and crew changes—matters which called for vital decisions to be made instantaneously and cabled to many different stations in a matter of minutes. Similar praise must be accorded to B.O.A.C.'s associates, East African Airways Corporation, one of whose DC-3s carried Her Majesty on the initial part of the journey, the 500 miles from Nanyuki to Entebbe. What better proof could there be of sound basic organization than that it rose to an emergency without hitch or confusion?

The scheduled E.T.A. of the Royal Party at London Airport was 4.30 p.m.; *Atalanta's* cabin door was opened almost to the second, the 4,127 miles from Entebbe having been flown without the slightest incident in 19 hours and 43 minutes.

In spite of the weight of grief and responsibility so suddenly placed upon her, the Queen made a point of personally expressing her appreciation to the crews; and her gracious thanks for this fine demonstration of airmanship are echoed by all her subjects.

Safety CAN be Cheap

BECAUSE there has grown up what amounts almost to a tradition in the aviation world, that cost must always take second place to efficiency—or rather more correctly, effectiveness—it is all too rarely that one comes across something which is cheap. Unfortunately, the word "cheap" nowadays carries a common-usage connotation of shoddiness which the plain meaning of the word in no way justifies.

We mention this because we are able to describe in this issue (page 182) an astonishingly cheap radar approach aid which, far from being shoddy or skimped, is well designed, well made, robust and effective. It is cheap because it is simple: it is simple because it is designed to do one straightforward job and to do it well.

G.C.A. and I.L.S. are still the *dernier cris* in approach aids, but nature respects neither persons nor great corporations, and the murk which can cloak London Airport can also cloak lesser airfields. The pilot of an Auster or Gemini, Viking or Comet, is equally in need of aid. But G.C.A. and I.L.S. cost scores of thousands of pounds, and only the great airports and the larger Service airfields can afford them. What then is the position of the charter pilot or the private pilot who is caught out by bad weather? He is simply advised to seek an alternative landing place and if, by so doing he is occasioned severe inconvenience, then it is just hard luck—it might have been worse.

Now, however, at a cost of a few thousand pounds—scarcely a twentieth of the cost of G.C.A.—any airfield will be able to have a "talk-down" approach aid whereby any aircraft equipped with V.H.F. can be brought down to a height of 250ft within half a mile of the boundary. Neither G.C.A. nor I.L.S. can do much more. This is not to suggest that the new system is a rival of the more elaborate and established approach aids; it is not. It has its limitations, and can offer neither the flexibility nor the refinement of G.C.A. or I.L.S. But it can, and does, offer a low-cost, reliable and eminently practical means whereby an aircraft can be directed to a safe position for making a visual landing. As such it must be recognized for what it is: a great step toward making flying safer for all those who are debarred from the major facilities.

In January, 1938, the King flew from Sandringham to Cranwell to inspect the cadets of the Royal Air Force College; he is seen leaving a Valentia transport. "Somewhere in France," a year later, His Majesty was photographed with an Air Force squadron in the field; part of a heavily camouflaged Fairey Battle may be distinguished. With a characteristic expression of lively anticipation, the King in his uniform of Marshal of the Royal Air Force alights from a Hertfordshire (Flamingo), having flown to visit aircraft workers in the South-East of England during the late summer of 1940.

KING GEORGE VI

"THE KING was greatly loved by all his peoples. He was respected as a man and as a prince far beyond the many realms over which he reigned. The simple dignity of his life, his manly virtues, his sense of duty—alike as a ruler and a servant of the vast spheres and communities for which he bore responsibility—his gay charm and happy nature, his example as a husband and a father in his own family circle, his courage in peace or war—all these were aspects of his character which won the glint of admiration, now here, now there, from the innumerable eyes whose gaze falls upon the Throne."—*Winston Churchill, February 7th, 1952.*

The photographs above show His late Majesty as a Wing Commander shortly before his accession in 1936, and, on the right—in an official portrait—in his full-dress uniform as Marshal of the Royal Air Force. (Left, below) Undoubtedly one of the happiest photographs of King George VI and the Royal Family was taken at his home at Balmoral on the occasion of a visit by Canadian cadets last year. (Right) King George VI, with his Queen, descends from the B.O.A.C. Argonaut after saying goodbye, two weeks ago, to his daughter, now Queen Elizabeth II, and the Duke of Edinburgh.

As Princess Elizabeth, the Queen, together with her sister Princess Margaret, flew frequently in Vikings of the King's Flight. Above, left, she is seen with Sir John D'Albiac, Commandant of London Airport; A. Cdre. Fielden, Captain of the King's Flight; and crew members. (Centre) Our smiling Queen with Air Marshal Sir Basil Embry on the occasion of her visit to Fighter Command H.Q. in the autumn of 1950. (Right) Her spirits undamped by heavy rain, the Queen shares a joke with the Chief of the Air Staff on the occasion of the presentation of the King's Colours to the R.A.F. in the U.K.

QUEEN ELIZABETH II

"FAMOUS have been the reigns of our Queens. Some of the greatest periods in our history have unfolded under their sceptre. Now that we have the second Queen Elizabeth also ascending the throne in her twenty-sixth year our thoughts are carried back nearly 400 years to the magnificent figure who presided over and, in many ways, embodied and inspired the grandeur and genius of the Elizabethan Age. . . . Already we know how well, and we understand why, her gifts and those of her husband, the Duke of Edinburgh, have stirred the only part of our Commonwealth she has yet been able to visit."—*Winston Churchill, February 7th, 1952.*

Above, Her Majesty Queen Elizabeth II is seen signing the guest log-book of the Royal Canadian Air Force in Canada last autumn. Right, the Queen pictured on the occasion of her visit to Fighter Command H.Q. Below, left, Her Majesty is seen inspecting the cadet wing in the passing-out parade at Cranwell. The central photograph was taken at London Airport shortly before the Queen and the Duke of Edinburgh took off for Nairobi. The remaining picture is of Her Majesty's sad homecoming to London Airport on February 7th—she is about to set foot in England for the first time as Queen Elizabeth II.

FLIGHT in the COMET

A Passenger's Impressions of a Two-hour 1,000-mile Tour over France in a Standard B.O.A.C. 36-seater

IT is difficult for an aeronautical journalist to derive any new stimulation from flying as such; but I must admit at once that when, last Friday, I flew in a Comet on a test flight from Hatfield, I experienced a degree of enjoyment which comes my way but rarely: so much so that it is not easy to keep enthusiasm within the bounds of the accuracy which factual description demands. The opportunity for the ride came when No. 3 Comet, the first production aircraft, was to be demonstrated to a number of distinguished official and other visitors from France: fortunately, there was a vacant seat which de Havillands at very short notice offered me, and even more fortunately, the aircraft was fully furnished and thus represented precisely the appointment which B.O.A.C. passengers will enjoy when the Comet shortly goes into service.

As may be remembered from the description of the Comet interior published in the September 7th, 1951, issue of *Flight*, at the forward end of the main cabin there is an eight-seat compartment with its chairs arranged in facing pairs separated by tables each side of the central aisle. I sat in the port outboard seat of the front row, i.e., facing aft. Just before mid-day the four Ghosts were started and we taxied out for take-off. We had, however, to wait for a few moments whilst John Derry took-off in the D.H. 110 prototype all-weather fighter—an event which was excitedly commented on by my French fellow-passengers. Then John Cunningham taxied us forward on to the runway, lined-up and we were off.

Although the static floor line of the Comet is level, seated as I was facing aft, I fully expected that, what with the acceleration to take-off speed and the nose-up take-off attitude, I should not be very comfortable. On the contrary, however, the acceleration seemed to be less marked than that one experiences in airscrew-driven airliners, and the initial climbing angle was scarcely perceptible in terms of seat attitude. What was so very impressive was the tremendous sense of height gained and forward speed: one expects it in a fighter but not when one is seated in a comfortable armchair. It was astonishingly quiet in the forward cabin, quieter even than I had expected knowing full well that turbojet travel *is* quiet. Livid masses of cloud fled past, and quick ripples of cobblestone-bumping made the aircraft quiver, whilst the wing tip seemingly almost lazily flexed to the turbulence: and then we were in the glittering effulgence of clear sunlight, brilliantly reflected from the snowfield of strato-cumulus below.

There were ragged holes through the cloud layer which let us glimpse the gloomy earth, but so sporadically as to be, at least to me, unrecognizable. From the position of the sun I could see that we were heading roughly south-south-west and, muddling with mental sums, I tried to calculate when we should cross the coast. In the event, as so often happens, the cloud thinned over the edge of the land, and there below us lay the sprawling shallow expanse of Chichester harbour: we had been in the air for 13 minutes.

I left my seat to go forward and have a word with John Cunningham, but so many other people had the same idea that it was some little time before I managed it. We were over mid-Channel at 25,000ft, and climbing normally at 1,000ft/minute; the Machmeter indicated 0.59, and the A.S.I. 228 kt, whilst the outside air temperature was registered as – 37 deg C. The Ghosts were turning over at 9,500 r.p.m., and their jet-pipe temperatures were all in the region of 600 deg. John was talking into his microphone to John Derry in the 110 some thousands of feet above us and scores of miles astern.

Back in the main cabin, I moved about sampling the various seat positions and with senses cocked for vibration and noise levels. The least quiet seats in the main cabin are those of the two foremost rows where, more or less abreast the compressors, the noise is a medium-pitched hum which I can best liken to that wonderful sound one hears from an Alfa cruising at about 80 m.p.h. Farther aft, the noise gets appreciably less, and the quietest seats are those of the second, third and fourth rows from the back. In making these comments on the noise level in the cabin, I must emphasize that the whole thing is relative, and even at its loudest the noise is appreciably less than that which one experiences in other aircraft. This, too, applies so far as vibration is concerned, and perhaps it will be enough for me to state, without reservation, that I have never flown so quietly or so smoothly in anything.

On the score of comfort, the standard B.O.A.C. Comet will offer the passenger almost everything he can desire. I say "almost" because, although the chairs themselves are delightfully comfortable and easily adjusted, the integrally moulded headrests are of a kind which, whilst providing a soft support for the top of the head, leave an uncomfortable gap at the nape of the neck. When I inspected the furnished mock-up some months ago, the chairs were fitted with small headrest pillows and it is to be hoped that such adjuncts to comfort will be supplied by the Corporation when the Comet services start. This is perhaps a minor criticism, but in view of the entirely new standard of travel which Comet passengers will enjoy, it seems unquestionable that no detail of appointment should be allowed to mar it.

Over the Channel Islands, 23 minutes after take-off, we could see the brown arrow-head of Portland Bill not far short of 100 miles away on our starboard quarter. And so we flew on, steadily gaining height, turning inland to port over St. Nazaire, and heading for Paris. Over France, as over England, the land was shrouded by a riddled veil of strato-cumulus, and so it was that, although John Cunningham swung the Comet round in a large circle, little of the French capital could be seen. The autodrome at Montlhéry was glimpsed; the huge runway at Bretigny could be seen quite clearly, and my companion pointed excitedly at what he said was Les Tuileries. Shortly after we turned back for Hatfield the engines' note underwent a perceptible change, and when I once more went forward into the cockpit, I found that the inboard engines had been cut back to 5,320 r.p.m., whilst the outboards were turning over at 6,250. I asked John if this was normal practice, and was told that it was, the idea being that the let-down should be made from 40,000ft at – 40 minutes E.T.A., the descent being kept constant at about 1,000ft/min and 220 kt I.A.S.

We arrived back at Hatfield at 12 minutes past two, having been in the air for two hours, nine minutes, and having flown very nearly one thousand miles. One knows that the Comet will put existing airliners in the shade; but truly one has to fly in it to realize how wholly dissatisfied passengers will be with other types once they have experienced Comet travel.

C. B. B-W.

BLACKPOOL'S BIG RUNWAY

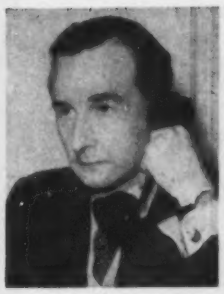
NEGOTIATIONS have recently been completed for the construction of a new main runway at Squire's Gate Airfield, Blackpool, and work will begin in the near future. It will be used in the flight-testing of Hawker aircraft, the makers of which have taken over the big "shadow" factory alongside the airfield, where Vickers built 3,406 Wellingtons during the war.

Nearly £1,000,000 will be spent on the new runway, which must be completed before Hawkers can go fully ahead with their jet-fighter programme (their existing airfield at Langley, Bucks, is inconveniently near London and Northolt Airports). Initially the runway will be 2,000yd long and later will be extended to 2,500yd; its width will be 200ft.

Because the runway will cut across a main road and into valuable agricultural and building land, it has been the subject of prolonged negotiations between Government departments and the local authorities concerned (Blackpool and Lytham St. Annes). The road it will cross—the only alternative road link between Blackpool and Lytham St. Annes—will, of course, have to be closed to traffic.

The new runway will be sited in the direction of the prevailing wind. When the airfield was originally built the main runway ran 1,420 yd E.N.E.-W.S.W., but since then it has been realized that the prevailing wind in the area is W.N.W.; it would therefore be impracticable to extend the existing main runway.

FROM ALL QUARTERS



The three Bristol executives whose new appointments are referred to below. Left to right: Sir Stanley White, Mr. George S. M. White and Mr. W. R. Verdon Smith.

Senior Re-appointments at Bristol

IMPORTANT changes on the board of the Bristol Aeroplane Co., Ltd., were announced last week. Sir G. Stanley White, Bt., who has been the managing director of the company (and of its predecessor in title, the British and Colonial Aeroplane Co., Ltd.) for the past 41 years, has relinquished that position and becomes deputy chairman.

Mr. W. R. Verdon Smith and Mr. George S. M. White, hitherto assistant managing directors, have been appointed managing directors.

Sir Stanley White is the son of Sir George White, founder and first chairman of the original company. On its formation in February 1910, Sir Stanley was appointed managing director, and under his direction such famous Bristol aircraft as the Boxkite, Fighter, Bulldog, Blenheim, Beaufighter and Brabazon have been produced. He has guided the organization from its inception in a single small hangar, where a handful of men were employed, to its present status of a major aircraft, engine and car-manufacturing firm, with subsidiary and associated companies in the United Kingdom, Canada and Australia.

His son, who is 38 years of age, was educated at Harrow and Cambridge, and worked in the shops of the engine division when he first joined the company in September, 1935. He later transferred to the production side of the aircraft division, becoming a director in December 1942, and, in April 1943, divisional managing director.

He is well known as chief of the company's car division, for the formation of which he was chiefly responsible. In his younger days he was internationally famed as a speed-boat pilot; he built his first boat when he was 17, and at one time held 13 British records and six world records. A 60-m.p.h. crash in Poole Harbour ended his career as a speed-boat pilot in 1938.

Mr. W. R. Verdon Smith became joint assistant managing director in 1947. Educated at Repton and Oxford, he joined the Bristol Co. in 1938, working in the commercial departments. He became commercial manager and in 1942 was appointed to the board, with responsibility for head-office administration.

In 1946 he was appointed president of the S.B.A.C.—the youngest president or chairman ever elected by that body—and in 1947 was re-elected for a further year of office. He has played a leading part in Bristol public life and in July 1947 he was appointed to the Government Economic Planning Board.

In addition to his position on the board of the parent Bristol Co., Mr. Verdon Smith is president of the Bristol Aeroplane Co. of Canada, Ltd., and director of the Bristol Aeroplane Co. (Australia), Pty. Ltd., formation of which was announced recently.

Auxiliary Freighters?

SOME eighteen months ago the Air Ministry approved the formation of Auxiliary Transport Squadrons, the first of which —No. 622— was forthwith organized by Airwork, Ltd. Similar units are expected to be established shortly by Huntings, Lancashire Aircraft Corporation and Scottish Aviation.

That Silver City Airways' fleet of eight Bristol Freighters has not yet been mentioned in this connection is remarked by a correspondent. If (he writes) we concede that past considerations of economy and a pronounced prejudice in favour of rear loading have kept the excellent and versatile Freighter from the squadrons of the R.A.F. for the past six years, we cannot, in view of the numerous orders from the other Commonwealth Air Forces, conceive that there is any good reason for the R.A.F.'s present lack of initiative in failing to stake a claim for this type by inviting the formation of a Freighter Auxiliary unit. Silver City are known to favour the idea, and when they get their six long-nosed, more powerful "Super Freighters," their fleet of 14 will unquestionably be of great potential military value compared with the Yorks, Valettas and Dakotas which will comprise the principal equipment of other Auxiliary Squadrons. Any squadron of Freighters would be more than just supplements to the regular Transport Command —they would be a completely unique section of the R.A.F.

The Freighter has two main military uses: it is eminently suitable for carrying vehicles over short distances and for moving bulky (but not necessarily heavy) equipment. When it comes to moving men, or less bulky equipment, then Yorks, Dakotas and Valettas are more economical and comparatively efficient. If, in emergency, it became necessary to get a lot of vehicles across a narrow stretch of water in a hurry, Silver City's Freighters would be capable of playing a valuable part. They hope to have about 18 Freighters in service by the end of next year. Assuming 14 were always serviceable, they could move 400 vehicles across 50 miles of water during the daylight hours.

Apart from its load-carrying capabilities, the Freighter has the other advantages of being able to operate from grass strips and of flying very well at full load on one engine.

From an operational point of view, other points in favour of the Freighter are its lack of complexity, the reliability and long overhaul life of its engines, and the fact that, in contrast to fighters and bombers, it will last for years without becoming obsolete. Like so many good aircraft of the "interim period," the Freighter did not quickly find official favour in its own country and even today it is a private company which perpetuates the success of this aircraft in these islands. If Transport Command has indeed, "missed the bus," the Auxiliary Squadron scheme does offer it this chance to catch up.

Maj. George Davis Missing

THE U.S.A.F. sustained a grave loss in Korea last Sunday, when Maj. George Davis was reported missing, believed killed. His aircraft was shot down over enemy territory after destroying two Migs, and he was not seen to bale out. These two last victories brought his total score to 11 fighters and three bombers.

Newark Again

FOR the third time in three months there has been a serious accident at Newark Airport, New Jersey. Within a few minutes of taking-off, a DC-6 belonging to National Airlines crashed into a block of flats in nearby Elizabethville in the early hours of Monday last, causing 34 deaths. The airport has now been closed to all traffic by the Port of New York Authority.

An Australian Pioneer Passes

FROM Mr. Hudson Fysh, Australian airline pioneer and head of Qantas, comes an appreciation of P. J. McGinness, D.F.C., D.C.M., whose death was recently reported from Perth, W.A. Here we publish Mr. Fysh's note in somewhat abbreviated form.

Born at Framlingham, Victoria, in 1896 (he writes), Paul McGinness—known to his intimates as "Ginty"—served with distinction as a cavalryman in Gallipoli in the First World War, then transferred to No. 1 Squadron of the Australian Flying Corps in Palestine, to come quickly to the fore as a Bristol Fighter pilot of courage and determination. Six or seven victories were credited to him and he received a D.F.C.

Back in Australia, in 1919, McGinness and Fysh, under orders from the Federal Government, chose, surveyed and laid down the Longreach-Darwin section of the first air route across Australia, used by Ross and Keith Smith, Parer and MacIntosh, and other pilots.

Then followed, in 1920, the formation of the original Qantas by McGinness, Fysh and McMaster. Much pioneer flying in Queensland was undertaken by McGinness, his efforts being rewarded by the opening on November 2nd, 1922, of the Charleville-Cloncurry regular service, the second in Australia and the first in Eastern Australia. In company with Arthur Baird as engineer, McGinness flew the Charleville-Longreach section of the new service.

Always an essentially adventurous spirit, and, in common with so many other pioneers who are not given to the humdrum and everyday aspects of life, McGinness drifted off to other adventures and occupations and was lost to aviation during later years.

HERE AND THERE

RETURN OF THE WANDERERS: Customs officers and air-traffic control staff awaiting the arrival of the R.A.F. Flying College world flights on February 7th. In the centre is S/L. G. F. Harcourt-Powell, A.F.C., the senior air traffic control officer at Manby. An account of the flights appears on page 196.
"Flight" photograph

Gun-sight—

DEVELOPED in lightweight form by General Electric from a naval anti-aircraft computer, a new experimental gun-sight tested on U.S.A.F. jet fighters is reported to have produced between two and four times the proportion of hits obtainable with types currently in use in Korea.

—and Bomb-sight

SAID to cost 31 times as much as the famous Norden bomb-sight used by the Americans in World War II, a new device known as the K-1 sight has been developed. Its existence was revealed last week by Mr. Thomas Finletter, U.S. Air Secretary, who told a Senate committee that it would "calculate by itself and operate through cloud and bad weather."

Last and First

AT Amsterdam last week, the last of an order for 25 Hawker Sea Furies, built under licence by the Fokker company, were formally transferred to the Dutch Navy. Fokkers also made formal delivery of the first "all-Dutch" Meteor 8; the previous Fokker series of 90 Meteors included some British-made parts.

Lecture by A.R.B.'s Chief

THE secretary and chief executive of the Air Registration Board, Mr. R. E. Hardingham, O.B.E., F.R.Ae.S., M.S.L.A.E., is to present the second main lecture of the Society of Licensed Aircraft Engineers' 1951-2 season. The subject is *Some of the Responsibilities and Problems of an Airworthiness Authority*, and the paper is due to be read at 3 p.m. on Saturday, February 23rd, at Manson House, 26 Portland Place, London, W.1.

The R.Ae.C. on Watch

HOW consistently the Royal Aero Club watches the interests of private pilots and others whose affairs come within its sphere of influence is well emphasized by the varied contents of a letter sent recently by the Club to the Minister of Transport and Civil Aviation. Based on proposals made by the Private Flying and Air Training Committee, and others received from the British Gliding Association and the Society of Model Aeronautical Engineers, questions raised in the letter refer to petrol-tax relief for private owners; landing cards and "annual hangarage" cards at M.C.A. airfields; the revival of Airmet; entertainment duty on air racing; ultra-light aircraft; F.A.I./R.Ae.C. Aviators' Certificates and the Private Pilot's Licence; various matters concerning model flying; and questions on gliding (including training of pilots and ground staffs; research; meteorological research and training of meterologists; equipment; and reduction of fees).

Two New U.S.A.F. Designations

THE long-range McDonnell XF-88A twin-jet fighter, as modified for production, is now designated the F-101. The latest Sabre, designed for the new and powerful Pratt and Whitney J-57 turbojet, is to receive the U.S.A.F. identification F-100; designated Sabre 45 by its makers, it has a wing swept at 45 deg, in contrast to the 35-deg sweep of the F-86.

The King's Funeral

PILOTS of civil aircraft have been instructed by the Ministry of Civil Aviation not to fly in the vicinity of the routes of the funeral processions of His late Majesty King George VI in London and Windsor today, Friday, February 15th. They are to keep at least six nautical miles from Marble Arch during the time the cortege travels from Westminster Hall to Paddington Station, and three nautical miles from Windsor Castle from the time that the funeral train arrives at Windsor Station until the end of the ceremony.

Mediterranean Rescue

UNITED STATES NAVY authorities in Washington last week gave high praise to the Royal Navy and Royal Air Force for the rescue of fourteen survivors from a Martin P4M Mercator which was lost off the coast of Cyprus. In particular, the destroyer H.M.S. *Chevron*, which picked up the survivors, was said to have performed "daring seamanship in rough water." The Mercator's pilot was not found. This is, we believe, the first news of this aircraft in the European theatre. Its normal crew is usually about nine or ten.

First Polar Landing Attempt

TWO aircraft, of unstated type, left the U.S.N. air station at Patuxent River, Maryland, last Sunday, bound for the John Hopkins University Arctic Laboratory at Point Barrow, Alaska. Another was due to follow during the week. With 34 persons on board—including one woman—the three are to fly on to the North Pole, where it is hoped to make the first polar landing. Among research objectives of the flight are the measurement of depth and salinity of the water under the ice, while it is also hoped to find whether homing pigeons can operate under polar conditions; a number of these birds are already in Alaska for acclimatization.

Lympne Serviceable Again

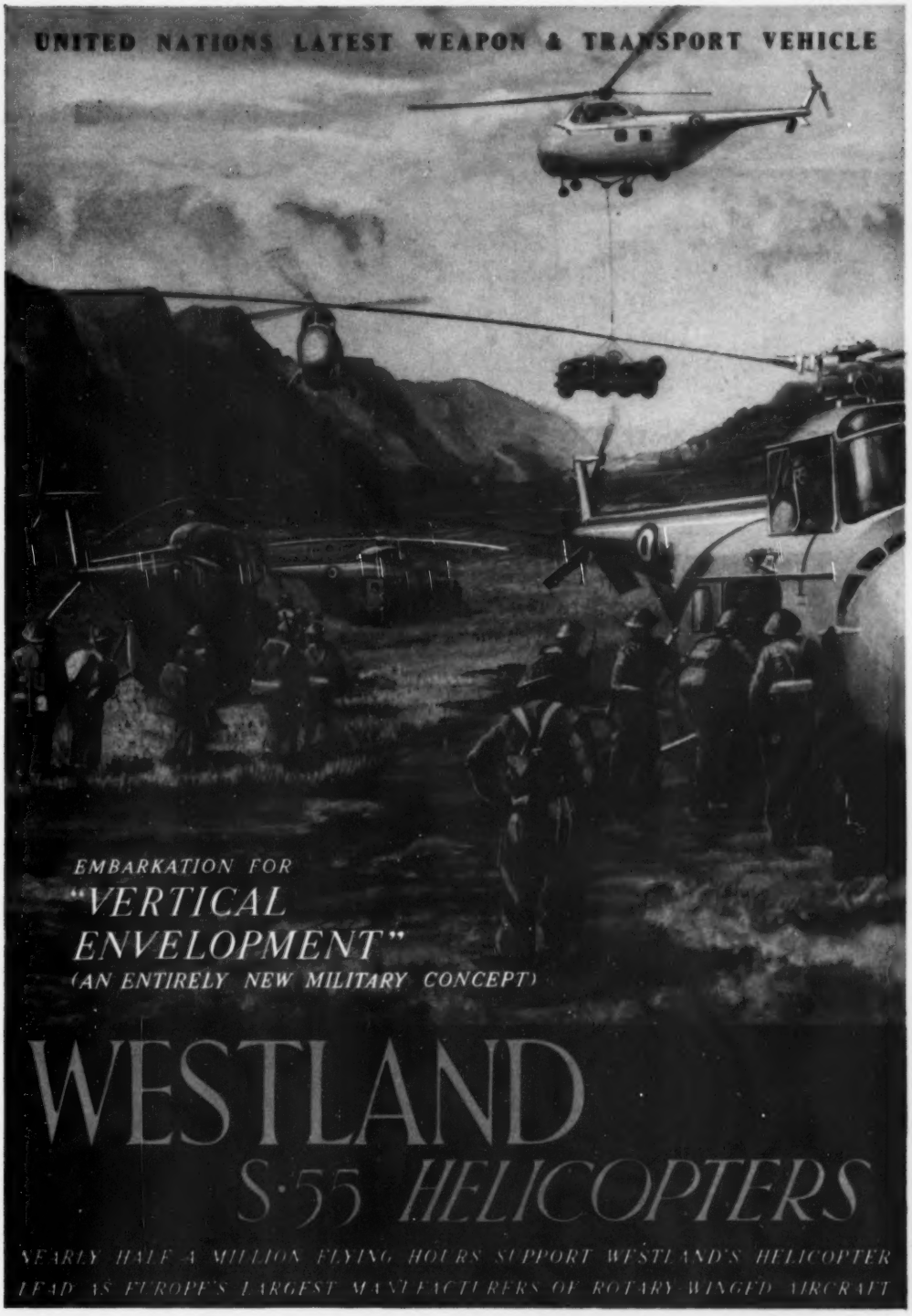
LAST week Lympne Airport became serviceable for the Bristol Freighters of Silver City Airways, after being closed to them for five weeks owing to the waterlogged state of the ground. As we have already recorded, Silver City—who last year paid the M.C.A. nearly £20,000 in landing fees—are pressing strongly for something to be done to prevent a repetition of the hold-up. During the five weeks, the company had been operating their cross-channel car ferry from Southend: cargoes have included export Hillman Minxes and over 100 live cows.

Sycamores for Australian Navy

THE Royal Australian Navy has ordered a number of Bristol Sycamore (Type 171) helicopters for air-sea rescue, photographic reconnaissance, and general communications. Equipment will include a winch for rescue work and a lengthened undercarriage "for specialist duties." Quick-action hydraulic wheel-braking to facilitate deck landings will also be fitted, and another feature is a rotor-blade-folding system to permit rapid stowage below decks. The R.A.N. order follows the recent completion of deck-landing trials on board the carrier H.M.S. *Triumph*.

Faith in the Flying-boat

"I AM seriously alarmed at a modern trend of thought in certain quarters, which appears to be to eliminate the flying-boat and to throw away all the knowledge which has been built up during many hard and strenuous years. To lose this valuable experience is to me nothing more nor less than a tragedy." This forthright expression of opinion is from the introduction to the Tenth Brancker Memorial Lecture, *The Flying-boat and its Place in Aviation*, given by Air Chief Marshal Sir Frederick Bowhill before the Institute of Transport in London last Monday evening. In a well-reasoned argument, Sir Frederick—who is Chief Aeronautical Adviser to the Ministry of Aviation—then proceeded to show why he (and, as he pointed out, thousands of would-be passengers) continue to have faith in this type of aircraft. We intend to publish a summary next week.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EMBARKATION FOR
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(AN ENTIRELY NEW MILITARY CONCEPT)
WESTLAND
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NEARLY HALF A MILLION FLYING HOURS SUPPORT WESTLAND'S HELICOPTER
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a tight turn....

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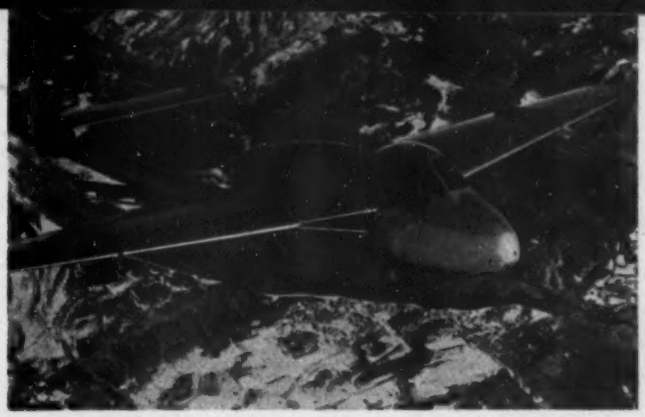


FENCES, natural and man-made, are visible in this new study of the fourth prototype S.N.C.A.S.E. Mistral, alias D.H.100 Vampire Mk 53. The wing boundary-layer fences resemble those of the Venom, though the Mistral wing is, in fact, aerodynamically similar to that of the Vampire.

Saab Outclimbs Sabre

ON the occasion of a recent Press visit to a Swedish air force base equipped with Saab J-29 fighters, it was announced that the top speed of these aircraft is "about 1,060 km/hr" (657 m.p.h.). The climb is reported to be superior to that of the Sabre, and the range is longer than that of the Mig-15.

Vertical Breeze

TWO Soviet parachutists who stepped out of an aircraft at 2,400ft near Minsk (says a story which has leaked through the Iron Curtain) found themselves in a thermal current which carried them rapidly upwards to nearly 4,000ft. One managed to escape from the lift after 40 minutes; the other, deliberately remaining in it, stayed aloft for two hours.

Big Contract for Ford

THE Ford Motor Company has been awarded a £10,700,000 contract for the manufacture of the Pratt and Whitney J-57 Turbo-Wasp for the U.S.A.F. Eight of these powerful turbojets are fitted to the prototype Boeing XB-52 bomber.

Israeli Gliding

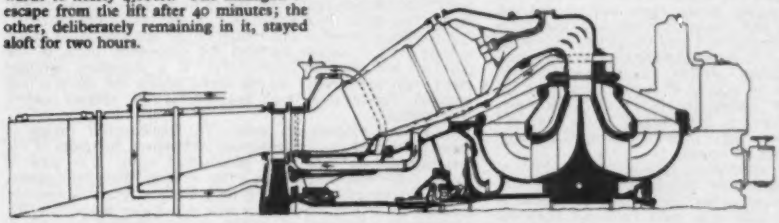
THE Government of Israel is reported to be encouraging gliding on a national scale. An American Schweizer 2-22 sailplane has been purchased, and two gliders have been designed in Tel Aviv; the weight of one of them is quoted as only 121lb (even an open-fuselage primary trainer usually weighs around 180lb).

U.S. Contracts for Germany?

THE U.S.A.F. is now studying the production potential of over 5,500 European manufacturers — mainly German — who were represented at the recent Air Force material exhibition in Frankfurt. Lt.-Gen. Norstad, the European C. in C. of the U.S.A.F., is quoted as saying that the exhibition was "a successful move to provide a broad basis for future agreements and contracts between the Air Force and European manufacturers."

Wheels or Wings?

NOTTINGHAM Sports Car Club has been using the perimeter of Gamston airfield, near Retford, for racing. Now that Gamston has passed back to Service use, the club is pressing for permission to use Tollerton instead; this would entail a prohibition of flying on six Saturday afternoons per year, but the Town Clerk of Nottingham has voiced his approval of the proposal, largely on account of the revenue which, it is thought, spectators would bring to the city.



A DEVELOPED NENE: This half-section of the Hispano Suiza R.300 Nene-development (referred to on page 146 last week) shows the flow of air tapped from the compressor for cooling the nozzle guide vanes. Overall dimensions are slightly greater than those of the Rolls-Royce Nene.

Air Council Dinner

THE Air Council gave a farewell dinner in honour of Maj-Gen. Leon W. Johnson, Commanding General of the 3rd Air Force, U.S.A.F., at the Dorchester Hotel, London, on Tuesday, February 5th. Lord De L'Isle and Dudley, V.C., Secretary of State for Air, received Maj-Gen. Johnson, together with Maj-Gen. John P. McConnell, Brig-Gen. Jack W. Wood, and The Hon. Julius Holmes. The Chief of the Air Staff, Marshal of the Royal Air Force Sir John Slessor, and six other members of the Air Council were also present.

Perpetuating the Pioneers

SIR JOHN ALCOCK and Sir Arthur Whitten-Brown, who made the first direct air crossing of the Atlantic in 1919, will certainly not be forgotten by future generations. Recently we mentioned a competition being held in Eire for a memorial to be placed at the spot where the Vimy landed in County Galway. On September 12th last, *The Times* published a letter from Newfoundland stating that plans were in hand for the erection of a memorial at St. John's, where the aircraft took off. Now comes news that the suggestion for an Alcock and Brown memorial at London Airport—put forward last August by James Mollison—has been approved by the R.Ae.C. Mr. William McMillan, R.A., has agreed to prepare a design depicting the two pioneers in flying clothes.

British Sailplane for Dutch Team

THE Royal Netherlands Aero Club is negotiating with Slingsby Sailplanes, Ltd., with a view to purchasing a Sky sailplane for use by a Dutch team in the International Gliding Contests this summer.

Steel-hard Aluminium

FIRST announced in 1950 (see *Flight* of July 27th, 1950, p. 130), the hard coating of aluminium, a process developed by two research workers of the Glenn L. Martin Co., Baltimore, is said to be finding applications throughout the whole of American industry. The company has now concluded arrangements with the Aluminium Co. of America, by which the latter will develop the process and make it available to industry on the widest possible basis. The process, known as MHC ("Martin Hard Coating"), is an electro-chemical one, and deposits a non-metallic layer of hard, heat-retentive material on to the base-metal, to which it is strongly bonded. It is stated that surface-smoothness is, in general, closely maintained by the coating.

BACK TO THE ORNITHOPTER: For centuries men have been trying to emulate birds in their ability to fly by flapping their wings. The latest failure is that of Berlin inventor Herbert Hirst, whose wings (made of bamboo, with parachute-silk "feathers") are operated by an arrangement of pedals and cables.

ABOUT THE INTERTROPICAL FRONT

Definition, Characteristics and Structures: A Summary of Current Knowledge

THERE will undoubtedly be readers in this country who have never heard of the I.T.F., while to others, particularly those who have travelled or lived overseas, the initials may mean a great deal in the form of wet or fine, stormy or calm, weather. To pilots, particularly those of R.A.F. Transport Command, the I.T.F. will have a special significance, for on such sections of their trunk routes as the ocean stage from Ceylon to Singapore, the mood of the front may make all the difference between a pleasant ride or a hectic one. Certain it is that aircrews treat the elusive and unpredictable intertropical front with great respect. That a memorandum on the subject by J. S. Sawyer, M.A.*, contains much of general interest, in addition to the specialized information for "met. men" and aircrews, is confirmed by these extracts.

IN recent years, and particularly during the latter part of the 1939-45 war, synoptic analysis and weather forecasting has been carried out in large areas of the tropical and equatorial regions, and a substantially increased number of observations from ground stations, aircraft and upper-air soundings have become available. As a result various techniques of analysis have been developed for use in tropical regions and numerous papers written about them.

Common to nearly all techniques of weather analysis in the equatorial regions is the concept of the intertropical front, also known as the equatorial front or intertropical convergence zone. Broadly, it is regarded as a relatively narrow zone into which air masses originating in the two hemispheres converge, resulting in a general upward motion and consequently disturbed weather. The two air masses involved usually have their origin in the trade winds of the two hemispheres.

Many papers have been written and numerous ideas put forward concerning the intertropical front. The writers are by no means agreed as to how it should be defined, what type of structure it has, the nature of the disturbances to which it is subject, nor how these may be forecast.

Two of the main features of the general pressure-distribution over the world are the belts of high pressure which encircle the earth in latitudes about 30 deg N. and 30 deg S., and the belt of relatively low pressure which lies between them in the region of the equator. Were the surface of the earth uniform and not broken by the continents and oceans, it is probable that these pressure belts would be continuous round the globe; but, owing to the higher temperatures of the continents than of the oceans in the same latitudes during summer, the subtropical high-pressure belts are broken by regions of low pressure over the continents in the "summer" hemisphere. The pressure-difference between continent and ocean is less marked in the "winter" season—pressure is relatively higher over the continents although anticyclonic cells persist over the oceans.

Over the oceans, the subtropical high-pressure belts and equatorial trough are most clearly defined, and here the N.E. trade winds of the northern hemisphere and the S.E. trade winds of the southern hemisphere blow with great regularity from the regions of high pressure towards the equatorial trough. Over land masses the trade-wind system is less clearly defined than over the ocean, and over Asia, South America and North Africa it breaks down entirely in summer, when the seasonal low-pressure system develops over the continent. When this occurs the trade winds of the opposite hemisphere continue across the equator towards the centre of low pressure. They are deflected on account of the earth's rotation, and form a monsoon current, usually with a westerly component.

Thus in the general circulation of the atmosphere a belt can be distinguished, encircling the earth in low latitudes, into which air streams of the lower atmosphere converge from the two hemispheres. In the predominantly oceanic regions the air streams are the two trade-wind currents, but over the continental masses one is usually a rather slow-moving mass of continental air, and the other a monsoon current formed from the trade winds of the opposite hemisphere. Over the oceanic regions this belt of convergence lies within 10 or 15 deg of the equator, but in summer over the continents it may be displaced 20 or 30 deg from the equator. Such a belt into which air streams converge is favourable for the formation of a front if the air streams have different air-mass properties.

The belt of convergence between the wind systems of the two hemispheres does represent a major air-mass boundary, if a diffuse one, and the term "intertropical front" will be here used to describe it. It must, however, be realized that it differs in many ways from the "fronts" of temperate latitudes.

Early in 1945 an American committee deliberated on the standardization of nomenclature in tropical weather analysis. The term "intertropical front" was not included among those recommended by them. In its place they recommended the use of:—

Intertropical trough.—The trough of low pressure found in the vicinity of the equator between the subtropical highs of the northern and southern hemispheres. It is orientated approximately east-west and is usually found within 200 miles of the equator. The trades of both hemispheres flow without marked convergence.

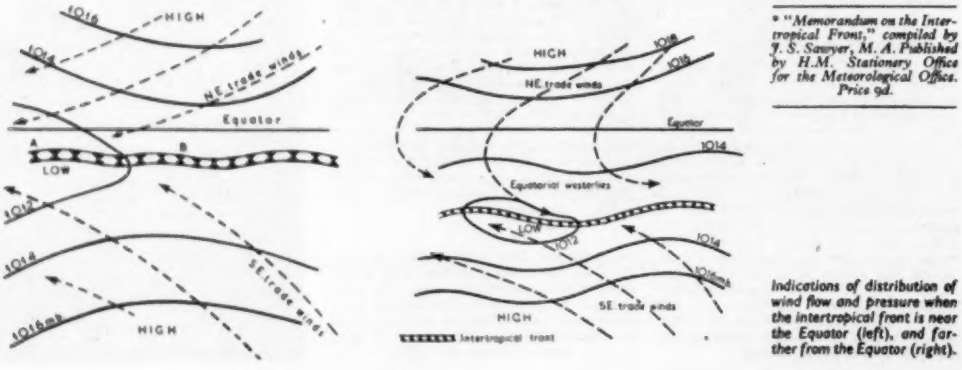
Intertropical convergence zone.—The intertropical trough is called the intertropical convergence zone where the trades of the two hemispheres meet at a pronounced angle. The zone is 50-200 miles wide and usually 5 deg or more from the equator. The air on the equatorial side is trade-wind air from the opposite hemisphere. If the convergence zone is 5 deg or more from the equator this wind turns to westerly as it approaches the zone.

Some writers use the terms "equatorial trough" and "equatorial front" with essentially the same meanings.

Characteristics—Oceanic Regions

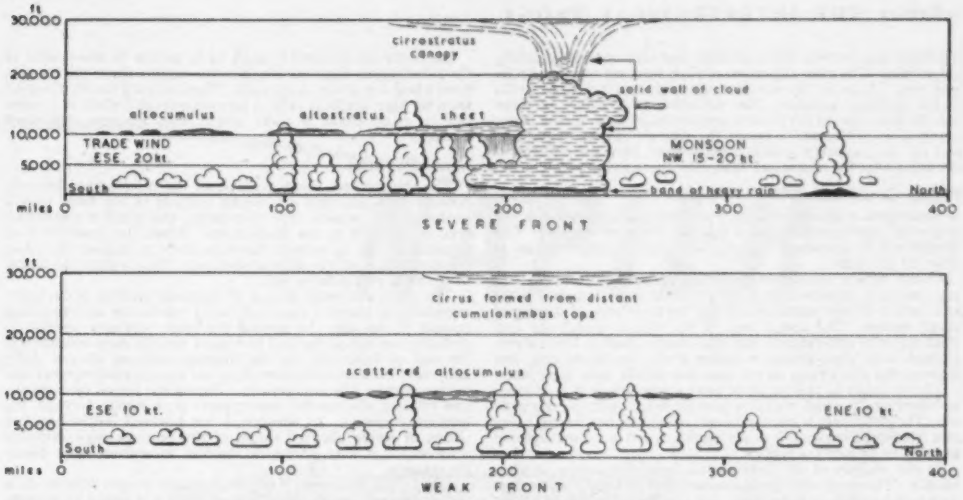
Over the oceanic regions the intertropical front is always to be found in a pressure trough between the subtropical anticyclones. Pressure along the intertropical front is nearly always between 1010 and 1013 mb (at midnight local time) except when an active disturbance is forming on it.

When the intertropical front is within a few degrees of the equator (5 deg or less), the wind flow in its vicinity over the lowest few thousand feet of the atmosphere is usually of the form indicated



Indications of distribution of wind flow and pressure when the intertropical front is near the Equator (left), and farther from the Equator (right).

* *"Memorandum on the Intertropical Front," compiled by J. S. Sawyer, M.A. Published by H.M. Stationery Office for the Meteorological Office. Price 9d.*



These typical north-south cross sections through the intertropical front are reproduced from the Air Ministry's Meteorological Reports No. 10 and with acknowledgement to the Director, Meteorological Office, Air Department, New Zealand.

opposite. When, however, the intertropical front is farther from the equator than this, the trade-wind air stream which has crossed the equator is usually deflected so that it has a westerly component. This is because an air stream tends to acquire anticyclonic vorticity when moving away from the equator. The resulting belt of westerly winds between the intertropical front and the equator is sometimes known as "equatorial westerlies." It is noteworthy that over the western Atlantic the S.E. trade winds of the southern hemisphere extend as easterly winds up the coast of South America, sometimes beyond 10 deg N.

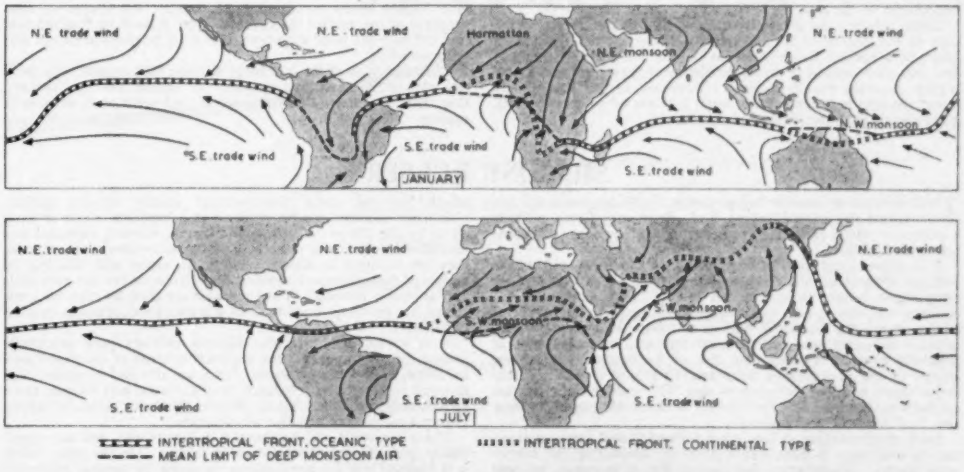
The surface winds usually show definite convergence towards the intertropical front, and, although as in higher latitudes there is a greater tendency for the surface wind to blow across the isobars than for the wind at a few thousand feet to do so, it is probable that there is definite convergence towards the intertropical front at least up to 5,000ft above the surface.

As indicated earlier the air masses which converge towards the intertropical front over the oceans are moist in the surface layers and relatively dry at higher levels; they also have a lapse-rate near, or slightly exceeding, the saturated adiabatic. When such air masses are slowly lifted by the general low-level convergence in the region of the intertropical front, instability develops and large cumulus clouds form, developing into cumulo-nimbus and giving rise to showers, squalls and thunderstorms. The intertropical front is thus primarily a band of convectional phenomena which varies in intensity and extent with the degree of convergence taking place.

The tops of the cumulo-nimbus and cumulus clouds spread out at levels where the lapse-rate is more stable and give rise to extensive sheets of alto-stratus and cirro-stratus cloud. Precipitation may be found falling from the former over wide areas. Several such layers of medium and high cloud may exist.

Characteristics—Continental Regions

In those regions where the intertropical front forms the summer limit of the penetration of a monsoon current into a continent, its



Mean positions of the intertropical front and main surface airstreams in the tropics for the conventional summer and winter months.

ABOUT THE INTERTROPICAL FRONT . . .

structure may be very different from that indicated in preceding paragraphs. The most important of such areas are northern India and west Africa in the northern summer, and north Australia in the southern summer. The difference in structure in these regions from that of the oceanic regions arises from (i) the larger temperature difference between the two air masses concerned, and (ii) the generally greater displacement from the equator of the front over the continents than over the oceans.

Flying Conditions

Conditions at the intertropical front vary considerably with the degree of convergence between the two major air streams. The frontal belt of disturbed weather may vary in width from 20-30 miles to 300 miles.

Under typical conditions there are frequent rainstorms and cumulus and cumulo-nimbus cloud; local thunderstorms occur and there is violent turbulence within the more strongly developed cloud masses. The upper parts of the clouds spread out into thick layers of alto-cumulus and alto-stratus cloud at levels above 15,000ft with cirro-stratus at higher levels, but below this, and between the alto-stratus layers, there are usually some clear lanes.

The visibility in the region is good except where it is reduced by heavy rain in which visibility from an aircraft falls to practically nil. The cloud base is usually 1,000ft or higher, but during heavy rain it is almost impossible to distinguish it, and it is often reported as being on or near the surface.

In the vicinity of the intertropical front the surface wind is squally. The usual wind-force attained in these squalls is Beaufort 4 or 5, but squalls of force 8 or 9 are occasionally reported. Over the ocean there is believed to be a diurnal increase in the amount of precipitation, reaching a maximum just before dawn and a minimum later in the morning or early afternoon. Over land the variation is the reverse of this except on coasts where the wind has a definite on-shore component, and the diurnal maximum of precipitation occurs in the early morning.

On occasions of vigorous development of the intertropical front some large rain areas occur, and thick masses of nimbo-stratus and alto-stratus cloud are to be found, with violent turbulence locally within the cloud masses. Usually conditions are somewhat "patchy" and areas of lighter rain and somewhat broken low cloud also exist. Flying in cloud through the intertropical front is therefore to be avoided, and it is usually considered best for an aircraft which cannot find a clear lane between clouds, to cross the intertropical front at as low a level as the type of aircraft and the nature of the terrain permit—certainly below 1,000ft above the surface. At these levels violent turbulence is much less likely to be encountered.

On the other hand, during periods of feeble development the intertropical front may degenerate into an area of broken cumulus cloud and scattered showers. This sometimes accompanies the development of a broad area of very light winds in place of the intertropical front. The term "doldrums" is used in a specialized sense by some meteorologists to describe such areas, and the greatest development of showers is said to exist along the boundaries of the area.

Little information is available about the height of the cloud tops in the region of the intertropical front; 20,000ft has been given as a normal figure over the Indian Ocean and Caribbean Sea, but on occasions of active development they certainly extend higher, reaching 25,000-30,000ft. Moreover, as the stratosphere is not reached over the equator until a height of 50,000-55,000ft, some clouds may even extend to these levels.

Ice formation in cloud is likely to be serious in active areas of the intertropical front for considerable heights above the freezing level which lies at about 15,000ft. Thus, crossing the intertropical front at high levels is only to be recommended when it is possible to avoid cloud at these levels; this, however, can often be done.

Mean Position

The approximate mean position of the intertropical front in January and July, and also which sections of the front have a predominantly oceanic type of structure and which a continental type is indicated in the illustrations. Where the structure is of continental type an attempt has been made to indicate the mean position of the limit of deep monsoon air. This is often the region of the main precipitation belt.

The north and south motion of the mean position of the intertropical front shows a considerable lag behind the corresponding motion of the sun. In general the most northerly position is probably reached at the end of August and the most southerly at the end of February, but the limiting positions do not differ materially from those illustrated for the conventional summer and winter months July and January. During the period between the two extreme seasons the intertropical front moves between the limiting positions. Its advance is not however continuous, but occurs in several forward surges of two or three days' duration after which it may retreat or dissolve to re-form again nearer the equator.

It is known that most, if not all, tropical cyclones form on, or in the vicinity of, the intertropical front when it is displaced between 5 and 15 deg of latitude from the equator. The actual mode of formation is not fully understood, but is believed by many authors to be associated with a strengthening of one of the trade-wind currents, and the extension of a degenerate cold front within the trade-wind current to the vicinity of the intertropical front. The cyclone is supposed by some authors to form at the so-called "triple point" thereby produced. However, although the mechanism of tropical cyclones is not understood, the areas which they affect and the tracks which they follow are well known.

As a result of the development of a tropical cyclone the intertropical front may be carried several hundred miles poleward from its normal position. After such a disturbance the normal atmospheric circulation is slowly re-established and the intertropical front usually re-forms in a position close to the mean for the season.

Forecasting the movement and intensity of the intertropical front and the development of disturbances on it has not yet been placed on a firm basis. In general the most important controlling factor is believed to be the strength of the trade-wind or monsoon currents which converge towards it. These currents are themselves controlled by the intensity and movements of the anticyclones in the subtropical high-pressure belt, but whether knowledge of the changes in the subtropical anticyclonic region can be applied to forecasting changes in the intertropical front is doubtful.

Forecasting the degree of activity of the intertropical front has been largely based on attempts to forecast the degree of convergence of the surface air streams. Here it must be realized that it is not only the wind directions that must be considered but also their speeds.

Characteristics of the intertropical front vary considerably from one part of the world to another. It should also be realized that there are many other sources of bad weather in equatorial regions.

SILICONE RUBBERS

THE increasing interest being shown in Silicone rubbers has prompted Precision Rubbers, Ltd., Bagworth, Leics, to issue a summary of the chief characteristics of this new class of elastomeric materials.

It is pointed out that, in comparison with natural rubber, the Silicone compounds show rubber-like characteristics over a wider temperature range: thus, they can be kept plastic down to −70, or even −80 deg C, and will withstand exposure to temperatures of 150 or 200 deg C., and as high as 250 deg. C for short periods, without deterioration. Mechanical strength, unfortunately, is generally of a lower order than that of the best natural rubber, except at the extremes of temperature; this is not of primary importance, however, for gaskets and "O" sealing rings; in this connection there are Silicone rubbers available that exhibit a very low "set" under compression.

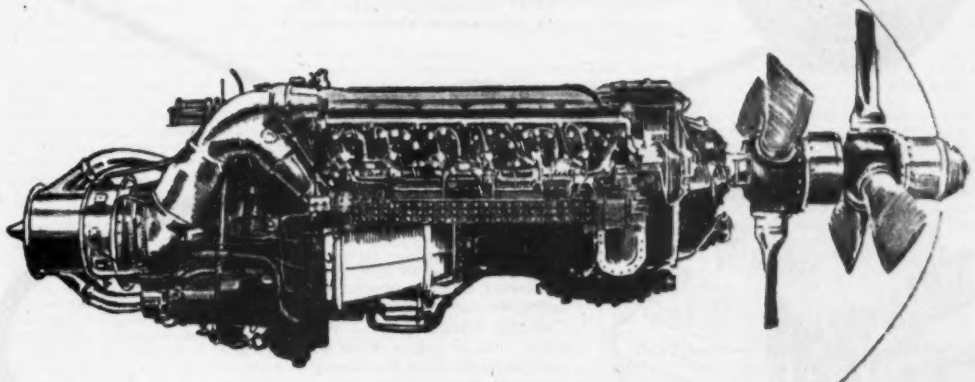
Such disadvantages as low tensile-strength and tear-resistance can be overcome in many applications by laminating the rubber with fabrics. Diaphragms and gaskets can, it is stated, be very satisfactorily made in lamination with glass fabric, a material which has the same heat-resistant quality as the rubber.

Silicone rubbers can be supplied in a hardness range of from 45 to 85 deg Shore "A" scale, and can be sheeted, extruded and moulded in much the same way as organic rubber. In general, they are resistant to alkalis, weak acids, ozone and oils, but by reason of their excessive swelling are unsuitable for use with fuels and aromatic solvents. They are also attacked by high-pressure steam, but are water-repellant and will give good service in tropical conditions.

It is stated, also, that the Silicone rubbers have practically constant dielectric properties, superior to those of the best elastic insulators at high temperatures. They are also said to exhibit high thermal conductivity, resistance to heat, ozone and fatigue; these factors should render them an obvious choice for electrical insulation in a number of arduous installations.

These materials are, however, a dollar import, and are appreciably more expensive than organic rubber. On the other hand, it is claimed that for applications requiring the special properties of silicone rubbers the extra expense can be fully justified.

NAPIER



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In this, the world's first composite gas turbine/piston engine, Napier have drawn upon their wide experience of aircraft diesel and gas turbine development to produce an engine of unparalleled economy. Successor to Napier engines that have made history, the Nomad is a further mark of Britain's technical leadership in the science of aircraft propulsion.

N.3

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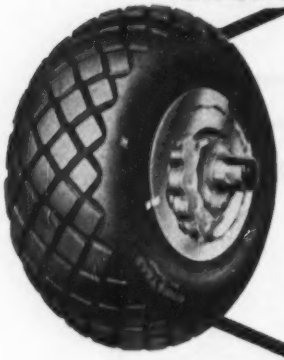
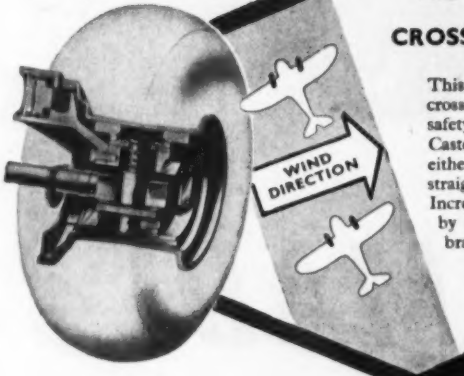
SAFETY ON TOUCHDOWN



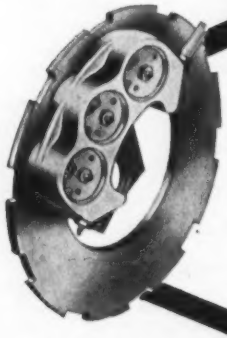
GOODYEAR
AIRCRAFT TYRES

Developed through years of research and testing, Goodyear aircraft tyres are built to " take it " on touchdown. Resistant to heat, fatigue and bruising, built to stand up to the impact of weight multiplied by m.p.h., they assure safety at today's high landing speeds. The All-Weather Tread illustrated is one of the variety of aircraft tyres, designed to give maximum reliability under all conditions.



GOODYEAR
CROSS WIND LANDING GEAR

This patented Goodyear device permits cross-wind landings or take-offs in relative safety, without any tendency to ground loop. Castoring wheels permit a yaw of 25° on either side of centre while maintaining a straight course along the runway.
Increased flying safety is further enhanced by the incorporation of the popular disc brake in this revolutionary castoring wheel.



GOODYEAR
ORIGINAL DISC BRAKES

The Disc Brake was first introduced by Goodyear several years ago. Since then the knowledge gained from actual operating experience has been vigorously applied, and to-day, the Goodyear Disc Brake has a reliability unique in this field. They give the pilot real confidence in landing, and sensitive control in every ground manoeuvre. Here again, Goodyear Research and Enterprise are far in the lead.

YOU CAN TRUST
GOODYEAR
AVIATION PRODUCTS
FOR UTMOST RELIABILITY

Semi-submersible Seaplane

A British "Water-walking" Design of 1912

By JOHN W. R. TAYLOR

REFERENCES to the 1929 Piaggio P.7 Schneider Trophy seaplane, in *Flight* of February 1st, call to mind a most interesting series of aircraft on comparable lines. They were built by the British and Colonial (Bristol) Aeroplane Company some 17 years earlier than the time of the Italian experiment.

These seaplanes, known simply and mysteriously as the X.1, X.2 and X.3, were projected by Sir Dennistoun Burney, inventor of the paravane, and, as originally conceived, they foreshadowed not only the Piaggio P.7 but also the submarine-based Parnall Peto and the Focke-Achgelis Fa330 rota-kite.

In 1912, Sir Dennistoun (then Lt. C. D. Burney, R.N.) appreciated the major role that submarines would play in any future war. Having made a number of oversea flights in a Bristol Box-kite fitted with flotation bags, he also realized that aeroplanes would one day be reliable and powerful enough to search out and destroy submarines and, conversely, to help them find their prey.

So he set to work designing an aeroplane that could be carried aboard a submarine, assembled quickly and flown off the water to provide, in effect, an airborne periscope. Such requirements would be difficult enough to meet today, and it is not hard to imagine how insoluble they must have seemed in the stick-and-string pioneer days. Nevertheless, Sir Dennistoun completed his design, and approached Bristols on the question of getting it built.

They must have been somewhat startled, for the original concept was for a collapsible seaplane made entirely of rubberized fabric, which could be stowed in a small compartment on a submarine and inflated only when required for action. Nor was that all, for instead of wheels, skids or floats, it was to have three stalky legs, carrying a marine propeller and series of hydrofoils.

The idea was that, after being inflated, the aircraft would be lowered over the side into the water, like the later Piaggio P.7. Then, for take-off, the pilot would start his engine and engage the marine propeller only. This would cause the aircraft to move forward and, at the same time, begin to lift its hull clear of the water by "stepping up" from one hydrofoil to the next. When he reached high speed and the bottom step, the pilot was supposed to engage the airscrew and take off.

It was wisely decided to try out one idea at a time, so the Bristol-built prototypes were intended to test the "hydroped" water undercarriage only, and were of normal construction. They were, in fact, the first Bristol designs by Frank Barnwell.

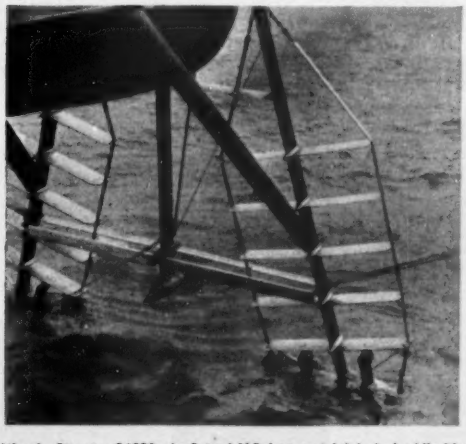
Towed behind a destroyer, the X.2 takes the air—but not for long.

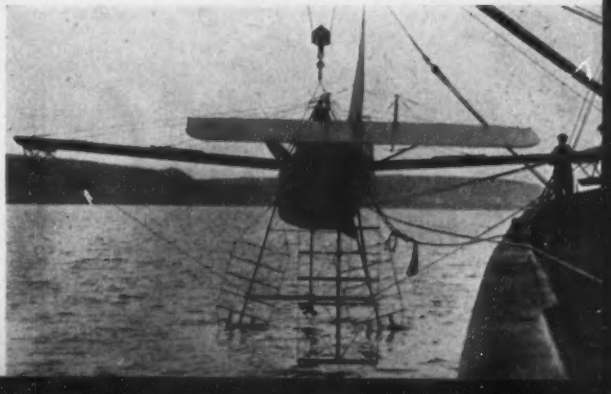
The X.1 was fitted with a Canton-Unné engine of either 80 or 110 h.p.; but it never left the water, as towing trials behind a destroyer showed that it was unstable at moderate speeds. In addition, the light streamline fairings behind the tubular hydroped legs were torn off by water drag.

To put things right, the aircraft was provided next with a water elevator and stronger hydroped undercarriage, with reduced hydrovane area. At the same time, the engine was replaced by 500 lb of ballast, and the design was renamed the X.2.

It achieved a measure of success on September 21st, 1912, for, while being towed dead into wind at 12 knots, it rose from the water and became airborne at the end of its tow-rope like a kite. Unfortunately, it then proceeded to do what almost any other self-respecting kite would have done in the circumstances: it stalled, and side-slipped into the water.

Heartened by this moderate success, Bristols at once set to work on the X.3, an improved version with more powerful engine, ailerons instead of wing warping, and redesigned hydroped, with contra-rotating marine propellers mounted back to back on a central strut to improve stability. This aircraft also achieved some success; but by then Short and Sopwith seaplanes and the Sopwith Bat Boat had demonstrated much simpler and more satisfactory approaches to the whole problem of sea-flying, and the Burney conception went the way of so many other ingenious designs.





Like the Piaggio of 1929, the Bristol X.3 (upper right) looked oddly like a half-swash wreck when stationary. Above is a close-up view of the hydrofoils on the undercarriage, and at right, below, is the complete machine. Note the corresponding set of hydrofoils under the tail, and the marine propeller with its vertical-shaft drive.

A SIMPLE APPROACH

New One-man Radar Talk-down System for Secondary Airports

As mentioned very briefly in our last week's issue, E. K. Cole, Ltd., of Southend-on-Sea, have developed a simplified radar approach aid designed for operation by one man. Intended for use at aerodromes where the traffic movement rate is insufficient to warrant the cost of G.C.A. or comparable equipment, the system has, in fact, now been operating for some little time at Southend Municipal Airport. The price of an installation is stated to be of the order of £3,500.

The concept of the new aid arose during discussions on the whole subject of aircraft blind approach technique between Ekco radar engineers and Mr. Bernard Collins, manager of Southend Airport. The idea was mooted that a "pencil" radar beam might be used to control an aircraft on a pre-determined approach pattern, and to test the practicability of the suggestion, initial experiments were made using an improvised theodolite. This optical "test-rig" proved that it was quite practical to keep a narrow beam sighted on an aircraft.

Initial Experiments

At that time (1949) Ekco were developing cloud and collision warning radar employing a 3-cm 10-kW transmitter-receiver, and an experimental pencil-beam radar installation was made up utilizing parts from the c.c.v. equipment. To avoid loss of range, and in the interests of simplicity and efficiency, no scanning in the normally accepted sense is used either in elevation or azimuth. The radar dish is mechanically mounted in common with the D/F aerial on a rotatable shaft, so that, by this means, the radar may be "put on" the aircraft automatically as the axis of the radar pencil beam coincides with the null direction of the D/F aerial. The radar dish is independently controllable in elevation and, having been directed at the aircraft by means of the D/F, the dish is merely swung over a few degrees in elevation by the operator. In practice, this arrangement works very well and it is stated that there has never been any difficulty in locating the aircraft.

The first prototype was installed in a converted single-deck bus, and for some time now has consistently given excellent service at Southend. The equipment was promulgated by the Ministry of Civil Aviation in an information circular issued on November 21st, 1951. With this equipment the aerials are manually directed by the operator rather in the manner of a submarine's periscope: in the later version, however, the operator is seated and aims the aerials in azimuth by a horizontally mounted hand-wheel, and in elevation by means of pedals. This refined version of the equipment is housed in a G.L. trailer and makes a very neat installation.

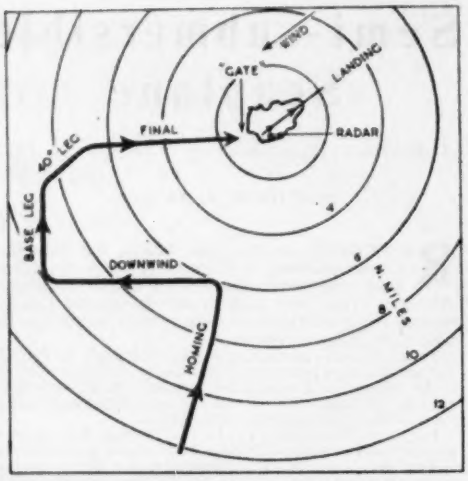
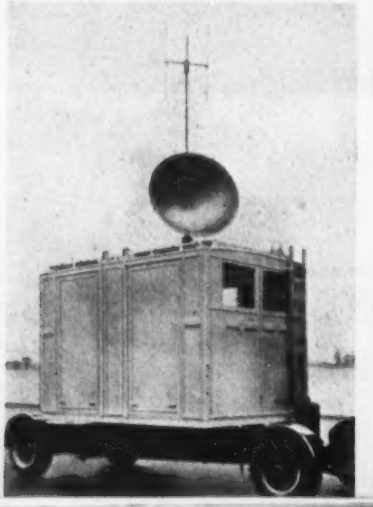


Diagram of typical approach pattern to Southend Airport.

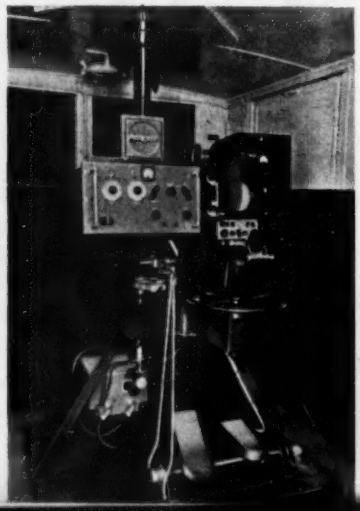
The radar display is a simple "A" scope presentation calibrated in nautical miles in two ranges, viz. 0-3 miles and 0-15 miles, and two scales are arranged to show the elevation and azimuthal angles. A series of adjustable contacts operated by cams on the scale-drives illuminate lights mounted close to the "A" scope to indicate when the aircraft is within the prescribed narrow limits of the desired course: if these limits are exceeded either in azimuth or elevation, the appropriate light is illuminated. The necessary approach instructions are conveyed to the pilot by means of a separate V.H.F. transmitter receiver, the microphone and speaker of which are mounted adjacent to the operator when watching the display. Visual indication of the D/F aerial null position is given by an audiometer mounted beside the azimuth scale.

A pilot using the approach aid is told to fly at 2,500ft on a given barometric pressure, and is brought to within radar contact by means of the V.H.F. D/F. When the echo is seen on the "A" scope, the pilot is directed to turn the aircraft through 90 deg for identification and is then given a new course to bring him on to the down-wind leg of the approach pattern, thereafter being told to reduce height to 1,500ft. A further 90-deg turn then brings the aircraft on to the base leg, which is followed by a 40-deg turn to a point from which the final approach is made. From this point the pilot is "talked down" to a "gate" at a height of 250ft and half a mile from touch-down; he is then given a new heading for the runway and told to make a visual landing.



(Left) The latest version of the equipment can conveniently be housed in a standard Service-type trailer and makes a neat mobile unit.

(Right) The controls of the newer equipment allow the operator to be seated, and the azimuth and elevation indicators are grouped with the scope, beneath a common hood.



These and other aircraft have the Martin-Baker Patent Ejection Seat.

- V.S. 508
- VENOM
- METEOR
- VALIANT
- AVRO 707
- WYVERN
- ATTACKER
- FIAT G.80
- HAWKER 1067
- GLOSTER G.A.5
- ARSENAL V.G.90
- BOULTON PAUL P.111
- MYSTERE M.D. 452
- AVRO C.F. 100
- FAIREY F.D.1.
- FOKKER S.14
- SEA HAWK
- CANBERRA
- OURAGAN
- D.H. 110
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Ejection Seats

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NOCTURNAL VAMPIRE

Details of the De Havilland D.H. 113 Night Fighter

THE time-lag which, under the present system, seemingly must elapse between the emergence of a prototype and the squadron service of the production aircraft has not infrequently been a subject at issue in this journal. It is mentioned once again here because, when visiting Hatfield a few days ago to cull the facts for this article, we saw the D.H. 110 on the tarmac. This new aircraft is to be subjected to evaluation trials *vis-à-vis* the Gloster G.A.5, and upon the results of the trials production orders may be placed. Some years from now, then, we can expect to see the 110 or the G.A.5—or perhaps both—in service as the standard all-weather multi-purpose fighters of the Royal Air Force.

Before that time can come about, however, the duty must be borne by an earlier type: the Venom. Production of Venoms in their several variants is, indeed, now going ahead, but none is yet in squadron service. In the meantime, therefore, the job of night protection is being shared by the Vampire N.F.10, and the Armstrong Whitworth developed Meteor N.F.11. Even so, these two types have not been in service for long—the first squadrons were equipped with them last summer—and thus it is that, although we have published brief particulars and photographs of what may be the "next but one" all-weather fighter, we are only now able to describe one of the types which has recently started to fulfil the night fighter rôle.

Another aspect of the time-lag is afforded by the fact that it is now over a year ago since we gave a full description of the Vampire Trainer, and in that article we stated that the Trainer was developed from the night fighter : a fact which is borne out by the respective de Havilland type numbers, viz., 113 for the night fighter and 115 for the Trainer. This accords curiously with the fact that the Venom has the D.H. type number 112, and yet the latest (and still heavily restricted) prototype all-weather fighter is the 110.

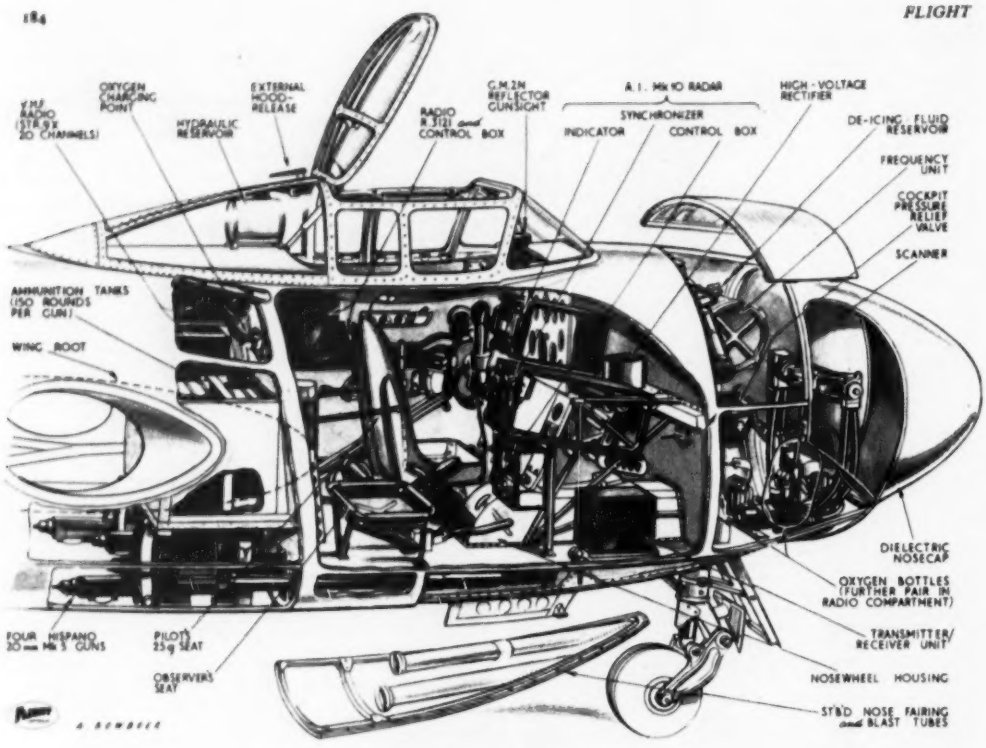
The explanation is that the basic Vampire is the D.H. 100, and the preliminary design-study for the new all-weather multi-purpose fighter, the 110, was made some years ago. As time went on, and experience was amassed with the Vampire, it became evident that an adaptation of the design with greater power and enhanced performance would find a ready place; thus the Venom came about. But it was subsequently realized that, even so, useful variants of the Vampire were possible quite aside from the Venom, and thus designs were prepared for modified versions of the Vampire—a night fighter first and, logically following it, the Trainer.

As well as being in service with the Royal Air Force, the night fighter has been ordered by the Italian Government, and first deliveries have already been made. Venom night fighters are to be built under licence in Italy by Fiat, Macchi and (sub-contracted components) Ambrosini, whilst the Ghost turbojet which powers the aircraft is to be built by Fiat and Alfa-Romeo. Until such time as the Italian-built Venoms reach squadron service, the Vampire night fighter will afford the double advantage of providing night protection whilst at the same time serving as a means whereby the squadrons can gain training and operational experience.

It is not our intention here to deal at length with the detail design of the N.F.10, for all the salient features of the basic aircraft design were given in our description of the Trainer (*Flight*, November 23rd, 1950). Essentially, the night fighter and Trainer are the same aircraft and differ only in nose construction, radar installation, cockpit layout and instrumentation, and canopy design. It is, therefore, on the specific differences of the night fighter relative to the Trainer that this article is based. First, however, it should be noted that both the night fighter and the Trainer are in effect two-seater (side-by-side) versions of the standard single-seater Vampire 5 fitted with 3,350 lb s.t. Goblin 3 turbojets.

When the night fighter was being developed the standard tail surfaces of the Mk 5 were employed in the interests of interchangeability, but during the flight trials of the prototype it was found that the increase of keel surface resulting from the lengthened nose brought about insufficient stability in yaw. An attempt was made to cure this by increasing the area of the fins by means of dorsal fillets. This measure proved ineffective, however, so, as an alternative, and rudder area was increased by heightening the tip, whilst keeping the chord constant. The combination of better flow conditions and increased moment arm so obtained proved entirely satisfactory. Just as the increased nose-area affected directional stability, so also it had its effect on stability in pitch. The elevator trim tab was therefore enlarged in span and the tailplane area increased by the fitting of tips outboard of the vertical surfaces. In passing, it might be noted that these modifications to the empennage apply also to the Vampire Trainer, the Venom night fighter, and the Sea Venom, whilst the single-seater Mk 1 day fighter Venom has the extended tailplane but not the increased rudder area.

By comparison with the Trainer the nose profile of the night fighter is a trifle slimmer, in that the nose has been extended forward 2in. Again, whereas the Trainer has a light-alloy premaxilla to its alligator nose, the night fighter has a dielectric nosecap of Nuron resin-bonded Fibreglass. The trailing edge of this radome is cut forward



The particular viewpoint chosen for the above drawing was decided upon in order that our artist should be able to illustrate to the best advantage the disposition of the various components of the radar installation. To this end, the wing has not been drawn, although the outline of the root is dotted in around the intake aperture through the fuselage. The whole arrangement of the radar installation is neat and offers excellent accessibility.

NOCTURNAL VAMPIRE . . .

at the base and is here rim-bolted to the lower "jaw" of the fuselage. The upper half of the nosecap trailing-edge is stabilized by an internal half-ring with a free flange to form a rebate for the access doors bridging the gap between the radome and the cockpit front bulkhead. The base edges of these fairing doors are locked with a pair of hook fittings, whilst the top edges meet on the fuselage centre-line and lock together with a pair of flush-fitting toggle fasteners.

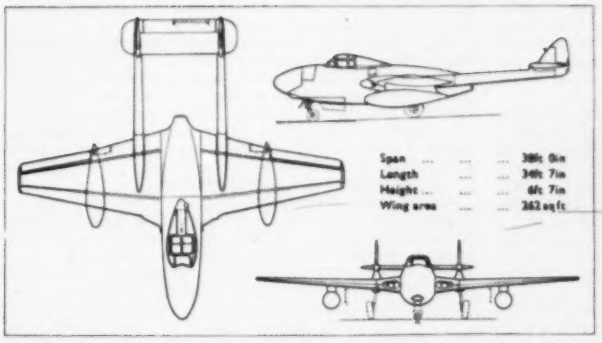
The radar equipment installed in the night fighter is A.I. Mk 10, the scanner unit of which is mounted just within the radome nosecap. The scanner is a conventional parabolic reflector dish and aerial assembly mounted in an inverted stirrup yoke so as to give (limited) freedom of movement in azimuth and zenith, that is to say, in the horizontal and vertical planes. Considering the comparatively small size of the aircraft, the scanner is quite large—the diameter is about 2ft—but the accommodation of a unit of this size has been made possible only by distorting the base line of the nose in a slight bulge which fairs in the scanner motor.

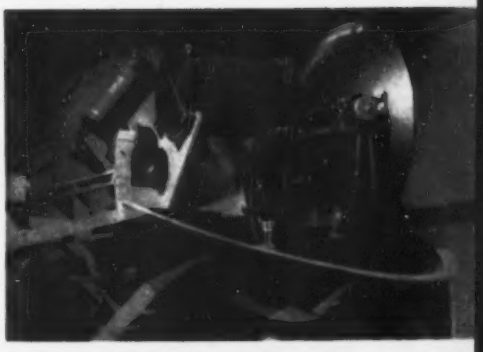
Immediately abaft the scanner, at four and eight o'clock on the flanks of the nose, are a pair of oxygen bottles which form half the total supply; the complementary bottles are mounted behind the cockpit rear bulkhead. As in the Trainer, the windscreen de-icing tank and the pressurization relief valve are mounted on the front face of the cockpit front bulkhead, but in the night fighter they are positioned a little differently in order to make room for the cylindrical container which houses the radar frequency unit.

In its general arrangement the cockpit canopy of the night fighter is essentially similar to that of the Trainer, but there are one or two detail differences. Relative to ground datum the overall height of the canopy is the same for both aircraft, but the cockpit rails on the night fighter are a little higher so that, in effect, the canopy is shallower. Another detail difference is that the front screen is asymmetric, being offset to port in favour of the pilot. Only the pilot has a d.v. panel (the port bow screen) and as a result of the heavy framing of this panel, plus the offset of the front screen, the starboard bow screen appears to be larger than in fact it is. The front screen is a four-ply Triplex unit, the two inner ¼in-thick panels of which are fronted and backed by 3/16in-thick panels. All four of these panels are sandwiched with Vinal interlayers. The remainder of the cockpit glazing is of Perspex.

The actual arrangement of controls, instruments and equipment in the cockpit is admirably illustrated in the accompanying drawing and does not need elaboration. It might, however, be pointed out that, whereas the Trainer is equipped with the Mk IV E gyro gunsight, the night fighter makes use of the ordinary reflector sight of earlier standard. Considering how relatively bulky are the cockpit components of the radar installation, they fit very neatly indeed in a vertical tier on the starboard side abreast the blind-flying panel. At the bottom is the control box with, immediately above it, the synchronizer; the top unit, which in common with the synchronizer is raked at an angle on its mounting, is the indicator. This embodies two screens, on the right-hand one of which target range is given in azimuth (i.e.,

(*Continued after illustrations opposite*)





(Above, right) *Although it shows the original wooden mock-up, this photograph nevertheless usefully serves to illustrate the scanner and other radar and ancillary service components housed in the nose of the aircraft.*

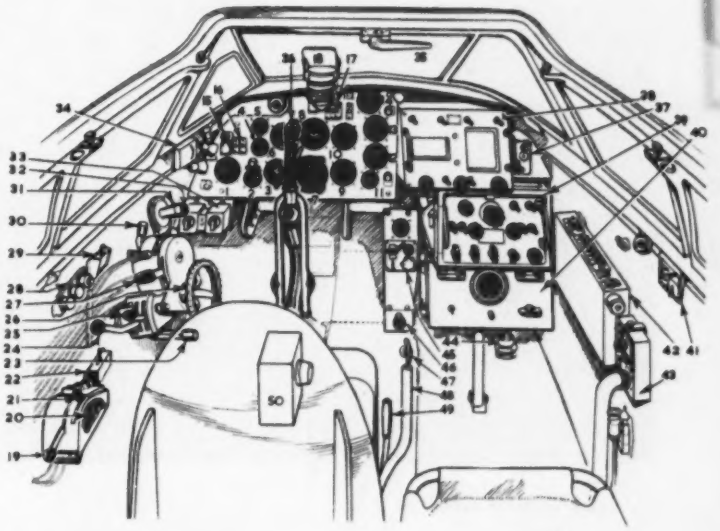
(Right) *The night-fighter prototype is here seen at the interim stage of tail-surface development. The fin and rudder contours, and the absence of tail-plane tips, should be contrasted with the production aircraft shown on the previous page.*

KEY TO COCKPIT LAYOUT

1. Brake pressure.
2. Undercarriage position indicator and warning light.
3. Altimeter.
4. Flap-position indicator.
5. Clock.
6. Air-speed indicator.
7. G4F compass indicator.
8. Artificial horizon.
9. Turn and slip.
10. Rate of climb.
11. Cockpit differential air pressure.
12. Engine speed.
13. Jet pipe temperature.
14. Fuel contents.
15. Fire-suppression button and warning lamp.
16. Switches: fuel pump emergency and booster pump.
17. Starting group.
18. G.M. 2N gun-sight.
19. Drop-tank jettison.
20. Cockpit pressurizing and temperature.
21. Ground/flightswitch.
22. Undercarriage emergency retraction.
23. Low-pressure fuel cock.
24. Undercarriage selector.
25. Flap selector.
26. Elevator trim.
27. Dive brake.
28. Light switches and gun-sight dimmer.
29. Emergency-light switch.
30. High-pressure fuel cock.
31. Throttle.
32. Press-to-speak.
33. STR. 9X radio controls.
34. Elevator-trim indicator.
35. Hood release.
36. Gun-button fire/safe.
37. G4F compass corrector.
38. Indicator
39. Synchronizer
40. Control box
41. Observer's oxygen regulator.
42. Switches: light, heating, gunsight and radar.
43. Radar control box.
44. Observer's press-to-speak.
45. Oxygen regulator, cockpit altimeter.
46. De-icing hand-pump.
47. Hood jettison.
48. Hydraulic hand-pump.
49. Pilot's seat adjustment.
50. R.3121 radio control.

A.I. Mk 10 radar.

The admirably neat layout of the cockpit is manifest below. Again in the interests of clarity, the viewing shroud through which the observer scans the radar screens has been omitted. Target range in azimuth is shown on the right-hand screen, and range in zenith is shown on the left-hand screen.



direction), whilst on the left-hand screen target range is given in zenith (i.e., height). The light emission from these screens, whilst not particularly bright, would be quite enough to impair the pilot's night vision and, for this reason, the observer scans the screens through a "what the butler saw" viewing-shroud.

Owing to the sharply defined demands of cockpit layout, the seats are staggered in all three dimensions. Laterally, the centre point of the pilot's seat is 8in to port of the fuselage centre-line, whilst the centre point of the observer's seat is 10in to starboard; fore and aft, the observer's seat is 15.15in abaft the pilot's seat; vertically, the observer's seat is fixed at 14.3in above the floor, whilst the pilot's seat is adjustable over a height range between 12.45in and 16.2in above the floor. Perhaps because he needs to bend forward to watch the viewing screens, perhaps because of limited space, the observer is not given a back to his seat; it is simply a pan on legs anchored rigidly to the floor. Whether any modification of this arrangement is foreseen we do not know; there are no Service trade unions.

As is to be expected, the performance of the night fighter matches that of the Trainer almost exactly, and both the two-seat versions can achieve a greater maximum speed at the higher altitudes than can the standard single-seater Vampire, this being ascribed to the enhanced fineness-ratio of their fuselage profiles, and despite the comparatively large flat area of the front screens. As may be seen from the various curves, the performance can be summarized as follows: The clean aircraft achieves its operational ceiling of 40,000ft in 16.3 min, and only slightly longer (17.5 min) is taken to reach the reduced operational ceiling of 34,000ft when the aircraft has the additional weight and drag of two 100-gal drop tanks. The complementary curves of rate of climb are particularly impressive, showing as they do that, even at the tropopause, the clean aircraft is capable of climbing at 1,500ft min. The curve of maximum level speed represents the performance of the clean aircraft at a mean weight of 9,900 lb, i.e., with approximately half fuel used. This shows that the aircraft achieves its best speed at 20,000ft, namely, 477 kt (M 0.775). As an extension of this context, it is apposite to tabulate the limiting true Mach number for various altitudes :—

Altitude (ft)	Limiting true Mach number
Sea Level	0.725
10,000	0.78
20,000	0.81
30,000	0.815
40,000	0.815

These figures apply to the aircraft without external equipment, and at low altitude the stressing limitation of 477 kt E.A.S. is the effective parameter. With drop tanks, the limiting Mach number at high altitude is M 0.755, whilst the stressing limitation is 390 kt E.A.S.

The ability of the Vampire to make high-speed turns in an astonishingly small compass is well known, but the curves of turn radii tell the story with marked effect. At 40,000ft, 400 kt represents a Mach number of 0.7 and it can be seen that, whilst the radius of steady turn is 1.95 nautical miles, the aircraft can, in fact, be pulled round at the minimum radius of 0.95 n.m. What is even more remarkable is that, at 375 kt at 30,000ft (M 0.65) it can make a 360 deg turn of but fractionally over 1 n.m. diameter.

On the score of range and endurance, perhaps the most concise method of giving the performance is again in tabular form. In this context, still-air range is taken to be the total distance that can be flown after allowance for the fuel used during take-off, climb and descent; the distance covered on climb and descent is credited to the range.

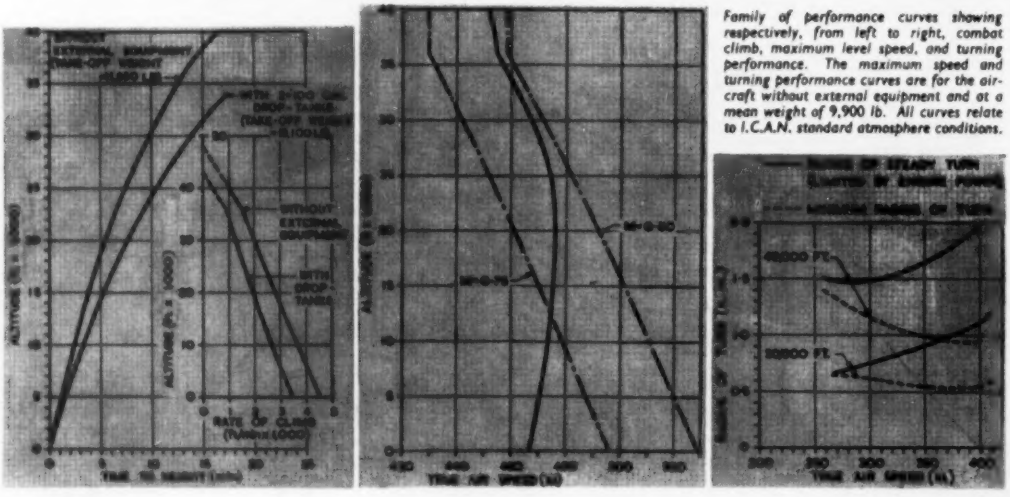
Altitude	Still-air Range, n.m.		Cruising Speed, kt	
	330 gal	530 gal	330 gal	530 gal
Sea Level	345	540	260	260
20,000	535	775	260	260
30,000	705	1,060	285	285
40,000	760	—	350	—

The patrol duration of the aircraft can be set out in the same manner and, again for these purposes, is taken to mean the time left for patrol after allowance is made for the fuel used for take-off, climb, ten minutes' combat at patrol altitude, and descent; the time for climb, combat and descent is not included.

Altitude	Patrol Duration, hours		Mean Patrol Speed, kt	
	330 gal	530 gal	330 gal	350 gal
Sea Level	1.20	2.30	170	170
20,000	1.30	2.35	230	230
30,000	1.45	2.70	275	275
40,000	1.20	—	335	—

It must be pointed out that the figures quoted in these two tables would need to be reduced somewhat for operational purposes in order to allow for a practical fuel reserve. This is, in fact, apparent from the definitions given for still-air range and patrol duration.

This brief survey of the salient performance features of the Vampire night fighter makes it clear that, even although the Venom night fighter (and, very likely, the D.H. 110 all-weather fighter) will give us night protection in the not-too-distant future, their smaller and less powerful brother is well fitted to carry the burden until these more advanced types are ready to take on the job. C.B.B-W.

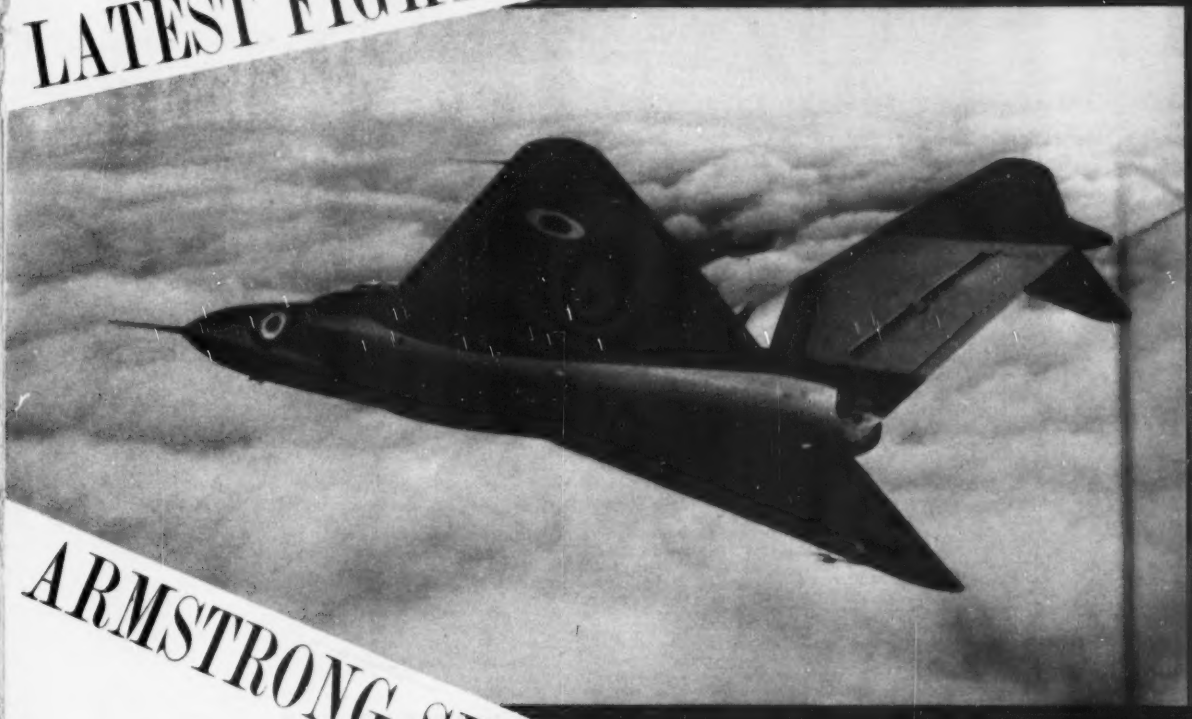


Family of performance curves showing respectively, from left to right, combat climb, maximum level speed, and turning performance. The maximum speed and turning performance curves are for the aircraft without external equipment and at a mean weight of 9,900 lb. All curves relate to I.C.A.N. standard atmosphere conditions.

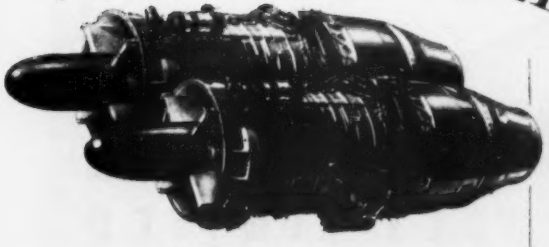
FLIGHT, 15 February 1952

The Gloster GA 5 Delta multi-purpose fighter with two Sapphire turbo-jets

LATEST FIGHTER POWERED BY THE



ARMSTRONG SIDDELEY



ALREADY 7,200 lb. THRUST

Sapphire

POWER PERFORMANCE

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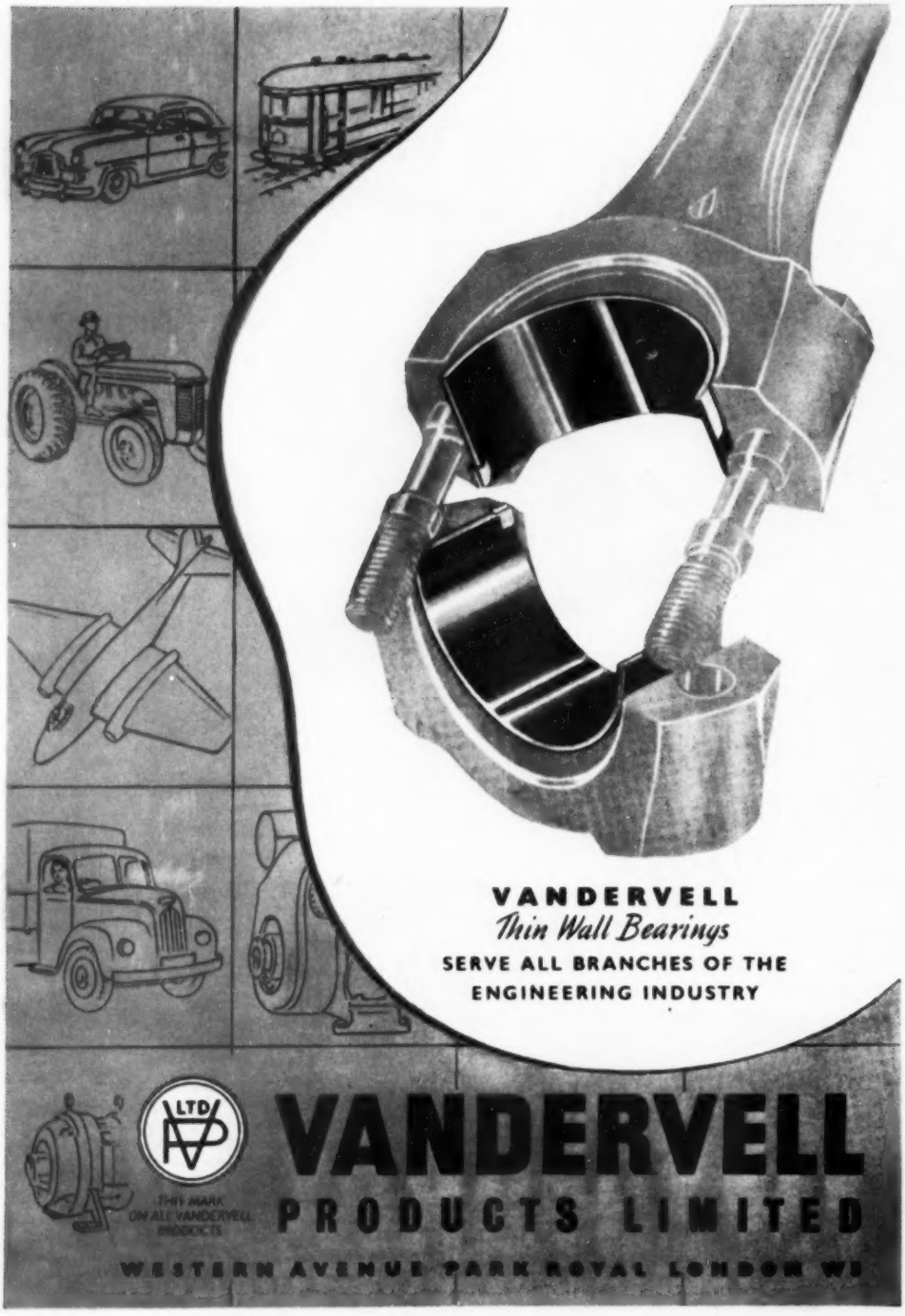
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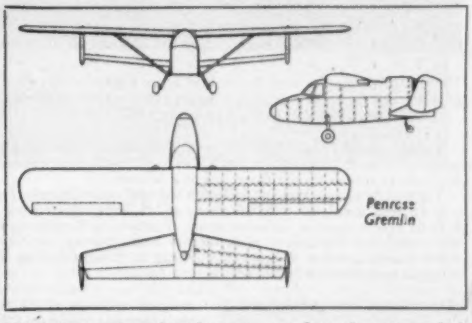
CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Simplicity for Cheapness

THE short description and drawing by "W.T.G." (*Flight*, January 25th) of a simplified light aeroplane caused me to dig into the archives for the enclosed design, showing another attack on the problem of cheap flying. I hardly feel that it could be done by thick monocoques unless of magnesium, otherwise the weight is enormous and in any case the cost is going to be pretty high.

My version, therefore, tries the variant of small size (since cost is roughly proportional to weight) coupled with simplicity of parts. One can hardly imagine a fuselage much smaller than the one shown, but a tandem arrangement of this form was proved entirely practicable by the experiment we conducted during the war with the Lysander, geometrically very similar. In view of the extended aft c.g. position which can be used (up to 0.7 chord) it seemed reasonable to take advantage of it by putting the engine right aft.



The design was investigated at any rate as far as the stress analysis and performance calculation, and would undoubtedly have been completed and the machine built but for a lamentable failure of the special Wren engine to materialize. All other power plants of somewhat similar power were just that little heavier and so brought the c.g. to the aft limit without margin. Nevertheless if one wants a really compact light aeroplane, something on these lines would give satisfactory performance at the lowest possible expense.

Yeovil, Somerset. H. J. PENROSE,
Westland Aircraft, Ltd.

Capt. Bertram Dickson

RECENT references in your correspondence columns to that truly magnificent early biplane pilot, Capt. Bertram Dickson, constitute a belated tribute to a flyer of such superlative skill, in that he was the only British airman of his day who could actually outfly the very best of the foreign champions.

It was Dickson who was one of the first—if not the first—pilots to give public performances of the then great novelty of the *vol-plané*. He would stop the engine of his Farman at about 1,500ft and, with propeller completely still, would glide down in slow, silent circles to make a perfect landing in the middle of the airfield. And he got as much as £500 for that feat alone at more than one of the early air meetings.

His fame ought to be assured from the fact that he was the first of all pilots to make a reconnaissance flight in connection with British military operations. This was at the manœuvres on Salisbury Plain in the summer of 1910. I followed them throughout, riding a little pioneer twin-cylinder Royal Enfield motor cycle, and Dickson was actually wearing my motor-cycle leggings—the morning being cold—when he made that first history-making reconnaissance flight. I have a photograph of him in my collection as he was reporting to headquarters afterwards.

There was no other pilot of his day, British or foreign, who could put a Farman through its paces with the beautiful "hands," and sheer precision of manœuvre, of which he was always the master. Even when there was more than one Farman in the air one always knew which one Dickson was flying, because there was something absolutely so masterly, so artistic, in the way he would climb, dive, bank, and land.

It was a tragedy for early flying when, at the Milan meeting, he was involved in the collision with the Antoinette pilot, Thomas, when coming in to land. For months he was in hospital in Milan, and though he recovered partially, and flew once or twice afterwards, that crash practically finished his flying career.

In this connection there is, by the way, a very odd story about Dickson and his sister. Prior to learning to fly, Dickson was a military consul out East, and he and his sister were both students of the occult. During a visit to London, it seems, they were making some special investigations in the British Museum, this bringing them into contact with the mummy of the famous Priestess of Amen-Ra. This mummy is said to bring ill-fortune to all who come under its influence too closely. And the point here is that soon afterwards Dickson's sister was shipwrecked while on a voyage, and almost lost her life—while he, going over to fly at Milan, was involved in the crash which injured him so severely that he never properly recovered from it. Not only this, but he was also dogged by other misfortunes, financial and otherwise.

Epsom, Surrey. HARRY HARPER.

International Navaids

I READ with great interest your leader in the January 25th issue concerning navigational aids, and would endorse your viewpoint that it is very necessary to reach an early decision on short-range navigational aid policy.

You state, however, in connection with the controversial question of V.O.R./D.M.E. or Decca, that "America is lined up against Europe, and particularly Britain, on this subject." To the best of my knowledge and belief this is not according to the facts and it would be truer to say that an influential body of opinion in this country is lined up against the rest of the world, which is consequently delaying the introduction of the V.O.R./D.M.E. system internationally. I am sure that an approach to any of the major European airlines would confirm the correctness of this view.

London, W.C.2. W. GREGSON,
Ferranti, Ltd.

New Forest Airfield

THAT flat plain between Beaulieu and Brockenhurst, on which were both the R.F.C. School in 1914-18 and the R.A.F. School in 1939-45, although possibly on different or overlapping areas, had an active flying school in May, 1910. It was called the McArdle School of Aviation, was run by W. F. McArdle ("Motor Mac" of Bournemouth), and was partly financed by Armstrong ("Chips") Drexel, of the U.S.A. It is described and illustrated in *The Aero* of May 31st, 1910. Col. Harry Delacombe had a lot to do with it.

Drexel took his ticket, No. 14, dated June 21st, 1910, on a Blériot at "Beaulieu." The next was Lt.-Col. H. R. Cook (No. 42, December 31st, 1910), who became for a time Assistant Commandant at the Central Flying School. Then came A. H. Aitken (No. 56, February 14th, 1911). Next was Quinto Poggioli (No. 65, February 28th). Among the pupils was F. Bernard Fowler, who bought up some of the Blériots and started the famous Eastbourne School at which he took his own ticket (No. 175, January 16th, 1912) and trained a number of R.N.A.S. pilots, whose names are now famous, before it was taken over by the Navy.

Bernard Fowler now lives in the New Forest, within half an hour's drive of the Beaulieu aerodrome.

Royal Aero Club. ANCIENT AVIATOR.

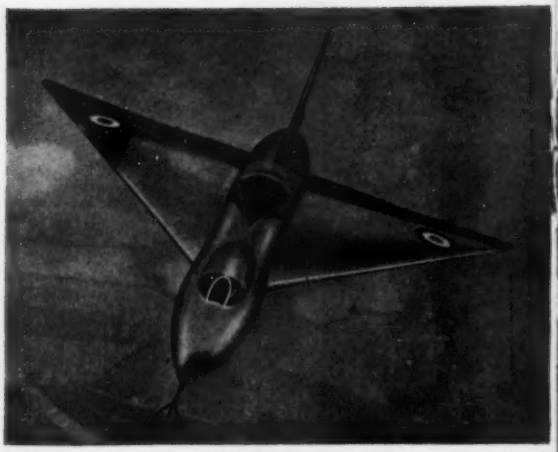
FORTHCOMING EVENTS

Feb. 18. Institute of Navigation: "Navigation Aids for Military Aircraft," by S/L. D. Bower.
Feb. 19. R.Ae.S. Section Lecture: "Glider Design," by K. G. Wilkinson, B.Sc., D.I.C., A.F.R.Ae.S.
Feb. 20. Aircraft Recognition Society: "The Exploration of Space," by A. C. Clarke, B.Sc.
Feb. 20. British Institution of Radio Engineers: "Search Radar for Civil Aircraft," by P. L. Stride.
Feb. 21. R.Ae.S.: "Power Steering for Aircraft," by K. G. Hancock, B.Sc., A.F.R.Ae.S., and P. Person, M.A., A.F.R.Ae.S. (at Hull).
Feb. 21. R.Ae.C.: Courtenay Film Show.
Feb. 21. Aerodrome Owners' Association: A.G.M. and Dinner.
Feb. 22. Helicopter Association: "Helicopter Power Plants," by A. Graham Forsyth, B.Sc., F.R.Ae.S.
Feb. 23. Society of Licenced Aircraft Engineers: Main Lecture: "Some of the Responsibilities and Problems of an Airworthiness Authority," by R. E. Hardingham, O.B.E., F.R.Ae.S., M.S.L.A.E.
Feb. 26. R.Ae.C.: Courtenay Film Show.
Feb. 26. R.Ae.S. Graduates' and Students' Lecture: Gliding and Meteorology Symposium.
Mar. 4. R.Ae.S. Section Lecture: "Bogie Undercarriages," by F. A. Cousins, B.Ae.E., A.F.R.Ae.S.
Mar. 6. R.Ae.S.: "A Study of Airport Noise," by J. D. Hayhurst, B.Sc.

FARNBOROUGH ON FILM

THE introduction of the Shell Film Unit's record of the S.B.A.C. Display has become one of the most eagerly awaited "first nights" in the aeronautical calendar. Titled *Highlights of Farnborough*, 1951, the newest of the series is, like all the Shell productions, a little masterpiece. Just as our own John Yoxall has perfected the technique of air-to-air "still" photography, so the Shell team has developed an individual style of ciné portraiture, and viewing their latest offering in the comfort of the cinema at Shell-Mex House, it is easy to forget that this has been secured only with a great deal of imagination and patience, not to mention physical discomfort, if not actual danger. The producers, Peter de Normanville and Bill Mason, and operator Sidney Beadle, are to be equally congratulated.

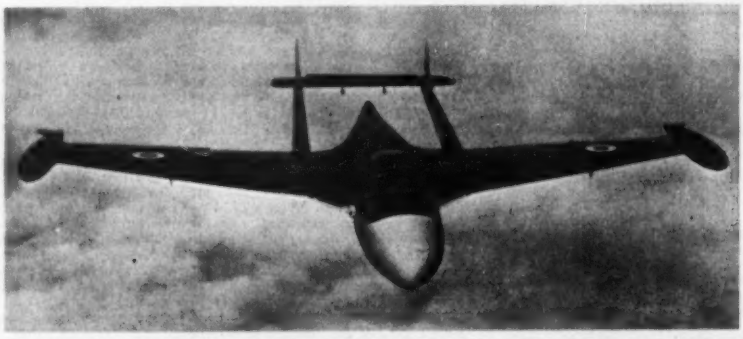
In the latest film one watches the huge Blackburn and General Aircraft G.A.L.60 in stately passage close by; the elegant Ambassador astern, changing from bank to bank with impressive agility; and the Vickers Viscount 700 emerging distantly from a cloudbank and drawing alongside into intimate proximity. The rocket-festooned Gloster P.V. ground-attack Meteor is planted squarely in the camera lens, to be followed by a breathless aerobatic sequence by 54 Squadron Vampires; then the reheat Venom blasts its way into the air, and the Sea Venom N.F.20 nuzzles the lens of the airborne camera. The Supermarine 535 makes its number from a more respectful distance before the Hawker P.1067 flashes across the airfield, screened in vapour. Altogether unfamiliar, the Supermarine 508 is glimpsed at various angles and the Sapphire-Canberra is seen leaping into the sky at close quarters. Finally, the two four-jet bombers—the Vickers Valiant and the Short S.A./4—are presented (the Valiant in air as well as ground sequences), and the three deltas—Avro 707A and B, and Boulton Paul P.111—make their bow in a series of superb air-to-air views. The raised trim flaps of the 707A are clearly visible as it takes its place in formation with the photographic machine.



The Avro 707B noses up to the Packet used by the Shell Film Unit photographers, and displays the air intake atop its surprisingly broad fuselage —broad enough, perhaps, to seat two, side-by-side.

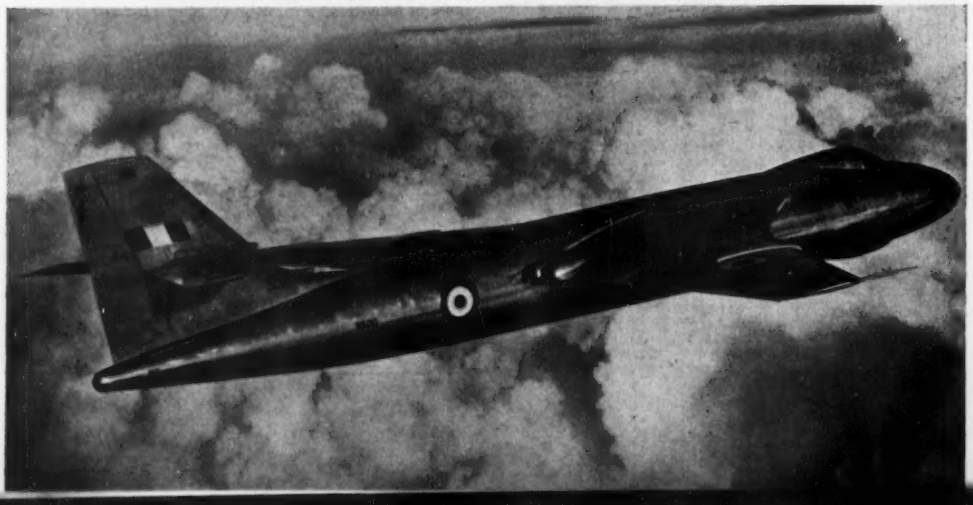
Through the telephoto lens a "Zurabatic cartwheel" and ensuing spin can be studied in comfort, and there is a first-hand impression of a roll, as seen from the front seat of a Meteor 7.

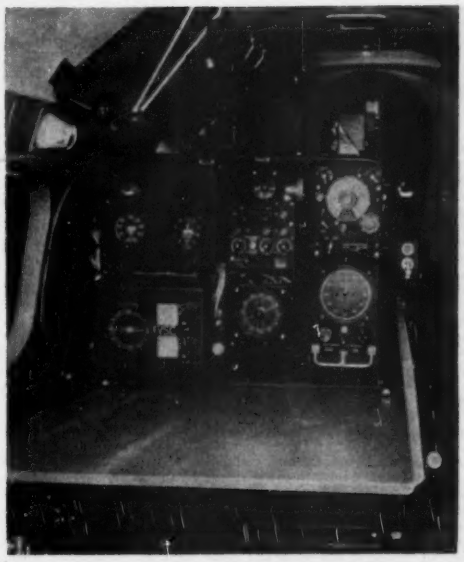
The beauty of this brilliant little film (it runs, unfortunately, for only 16 min) is enhanced by the music of Mr. Franz Reizenstein. Like its predecessors in the same series, *Highlights of Farnborough*, 1951, goes into the library of Petroleum Films Bureau, 29 New Bond Street, London W.1, whence it may be borrowed, free of charge, by responsible organizations.



Note, in this view of the de Havilland Sea Venom N.F.20 the ailerons and elevator are in use, possibly to counteract the slipstream created by the photographic aircraft.

The fuselage lines of the four-Avon Vickers Valiant are brought out to excellent effect in this Shell "still," secured on the same occasion as the film sequence of the Valiant referred to on this page.





On the left is seen one of the student-navigator's tables in the navigational-training R.N.Z.A.F. Devon. The equipment shown is: top row, air-temperature gauge, A.S.I. and altimeter, A.D.401 station box, D.F. control box; bottom row, A.P.I., Gyrosyn master indicator, and D.F. indicator and loop control. The external view, on the right, shows the A.D.7092 loop, in a blister above the cockpit, and the astrodome.

DEVONS FOR THE R.N.Z.A.F.

IN co-operation with the Royal New Zealand Air Force, the de Havilland Aircraft Co., Ltd., recently drew up specifications for two types of "flying class-room," one for instruction in radio communication and the other for training in radio navigation. Each was based broadly on the navigational and radio trainer version of the General-purpose Dove.

The first two aircraft of the R.N.Z.A.F. order, one of each type, have now been completed, and features are illustrated in the accompanying photographs, which indicate these Devons must be among the most up-to-date and comprehensively equipped aircraft yet designed for radio and navigational instruction.

The R.N.Z.A.F. have used Devons on communications work for the past three years and are thus well experienced in their operation. Details of the special equipment of these aircraft (serial numbers NZ1803 and 1804 respectively) are as follow :—

Navigational Training Model

(1) *Communications.*—Two H.F. transmitters, Marconi A.D.97; M.F. and H.F. receiver, Marconi A.D.108; provision for V.H.F. transmitter/receiver, Standard Telephones STR.1936.

(2) *Navigation aids.*—A.D.F. Marconi A.D.7092A; one receiver, one loop, two controllers, one bearing indicator, one bearing indicator and loop controller.

(3) *Approach aids.*—Stowage for Detrola radio-range receiver; Romac fan-marker beacon receiver with amber light; Rebecca Mk 4 radar equipment.

(4) *Intercom.*—Station boxes, Marconi A.D.401.

(5) Provision for I.F.F. R.3121 equipment.

(6) Two navigational tables, each fitted with A.S.I., altimeter, outside air temperature gauge, Gyrosyn master indicator (forward table), Gyrosyn D.R.C. repeater (aft table); clock; provision for A.P.I. Intercom station boxes, A.D.F. controls (forward table), Rebecca (forward table). Drift recorder (forward starboard side of cabin); camera orifice, astrodome and mounting for astro-compass; seating for two pupils and one instructor. Extra fuel tanks in cabin for long-range ferrying.

Signals Trainer

Equipment as navigational trainer up to (6); on the signals table are a Marconi A.D.107 transmitter, two tapping keys and two receivers, Marconi A.D.94.

PRODUCTION NEEDS A "MULBERRY SPIRIT"

THE Air League of the British Empire recently published a memorandum "The Expansion of British Aircraft Production," which supplemented the important speech made by the chairman, Air Chief Marshal Sir Guy Garrod, last November.

Expressing satisfaction that steps are being taken to deal with some aspects of the matter of manpower, the memorandum goes on to suggest that there has been a tendency to magnify unduly the difficulty of resolving the problem—"The number of men required to complete the current air-rearmament programme in fact amounts to less than 1 per cent of the total employed population; and although this statement, by itself, is of course an over-simplification, it does put the matter into . . . perspective. . . .

"A basic difficulty in the matter of man-power, perhaps the greatest, is that labour in this country is not now mobile. This is largely a matter of housing. In existing conditions, many men will prefer to remain in their employment, on short time, rather than leave their homes to move to a better or more urgent job, where they probably would not be able to find anywhere to live, or could do so only with great difficulty. Secondly, wages in many branches of the aircraft industry are lower than some other industries. Thirdly, the aircraft industry over many years has been subject, largely owing to inconsistent Government policy, to considerable fluctuations, with consequent insecurity of employment which makes many workers unwilling to rejoin it. A solution of this lack of mobility of labour is to take work to the men . . .

"The motor-car industry is at present much under-employed. It made a most valuable contribution to aircraft production during the last war, and has today substantial latent reserves of productive capacity. The men are there, the factories and machine-tools are there, and the rehousing problem does not arise.

"Reverting to the question of housing, the Council urges that emergency measures should be taken to provide at least 15,000 to 20,000 houses, primarily reserved for *skilled* men, in the neighbourhood of aircraft factories where housing shortage is acute. These houses should be dealt with outside the Government's general housing policy. Defence Regulations should be invoked wherever necessary to dispose of local authority or town-planning restrictions. . . . This should be regarded as a 'Mulberry' operation and carried out in that spirit.

"The Council desires to urge on His Majesty's Government the great possibilities for the expansion of aircraft exports. At the same time there should be a rapid extension by all three Services in the use of air transport, which forms so important an element of air power both in peace and in war.

"In view of the importance of securing the maximum 'active' service from National Service men and from men on short-term Regular engagements, the Council urges as an objective that all 'trooping' for the three Services should be done by air. In addition there should be much more 'fetching and carrying' by air. These developments, if entrusted largely to civil air operators, would lead to the creation of a strong Merchant Air Service, which would be of the utmost value as a reserve in time of war."

RADIO and TRAFFIC CONTROL

Further Abstracts from the Lecture by Mr. G. W. Stallibrass

LAST week we published abstracts from a British Institute of Radio Engineers' paper in which Mr. G. W. Stallibrass (of the M.C.A.'s Directorate of Navigational Services) discussed the problems confronting those concerned with the development of air radio and traffic-control aids. Among aspects of the subject dealt with in these further and concluding abstracts are methods of increasing landing rates; further development in instrument-approach systems; and the provision of aids over sparsely populated territories. Mr. Stallibrass also reviews the requirements for turbine-engined aircraft and has a word to say on the differences between the American and the British attitudes to current "aid" problems.

AS REGARDS methods of increasing the landing rate it is generally accepted that the minimum safe separation for aircraft in a vertical holding pattern is 1,000ft. This [said the lecturer] was confirmed by radar checks carried out last year, in which errors of some hundreds of feet were observed, often caused by pilots descending below their new altitude before levelling out. The risk of overshooting the next lower altitude is generally greater at high rates of descent, and for this and other reasons, including avoiding rapid changes of pressure in unpressurized aircraft or an uncomfortable floor angle, the chosen rate of descent is about 500ft/min. This means that each change of 1,000ft altitude level will take two minutes, and this irreducible element in the stack-leaving interval may ultimately prove the limiting factor in speeding up movement rates from a single stack.

Investigations are therefore proceeding into the practicability of feeding aircraft to a single runway from two stacks. If successful, the same principle could, of course, be used for feeding aircraft concurrently to parallel runways. However, when aircraft have to be phased from two stacks through a common gate, preliminary theoretical studies show that, if rapid landing rates are to be attained, present standards of time-keeping must be greatly improved. If the standard deviation of flight time is as much as a minute, it is difficult to achieve a properly separated frequency through the gate, even from a single traffic stream, if the landing intervals are to be as low as, say, three minutes. It becomes very much more difficult when the timing of an aircraft has to be adjusted not only to preceding aircraft in the same stream, bu also to other aircraft that are themselves under adjustment in the neighbouring stream from the other stack. Although a brilliant radar controller could achieve the desired result by his own personal knowledge and skill, no public service could be organized on the assumption that all its officers were artists of the highest order and were at the height of their powers for every minute of every watch; other means must necessarily be sought.

In the meantime, therefore, two things are clear. First, that accurate radar surveillance will be essential. Second, that some form of computor will be required to calculate the separation which will occur at the gate between aircraft on two different and curved flight paths, and if possible to display to the controller the heading instructions that should be passed to the aircraft concerned if adjusting action is required.

Given a flexible navigational system providing continuous indication of position, outgoing aircraft can join the airways at any predetermined point and need not suffer the present difficulties. The problem will still remain of feeding them into the airways at their required airways altitudes, but it can be greatly reduced by radar surveillance.

Instrument Approaches.—The step from a combination of aids that enables an aircraft to approach safely down to, say, 200ft, after which landings are completed visually, to an aid which enables the pilot to land his aircraft and finish the landing run without taking his eyes from the instruments, is a very large one indeed. The justification for it requires careful scrutiny, from the aspects of the inconvenience and dislocation caused to passengers by being diverted, the cost and trouble to operators in having to organize handling and diverted passengers and aircraft, and the expense to administrations in having to provide diversion airfields and facilities. One method of bridging the gap is in the provision of thermal fog dispersal (Fido). Assuming this is not always an economic proposition, it is worth considering what an enormous responsibility will be placed on the designers, manufacturers and operators of radio or radar facilities designed to provide completely blind landings.

The present concept of a minimum break-off height during an instrument approach, after which the aircraft should overshoot and climb away if the visibility from that height is insufficient for a visual landing, is based partly on the aerodrome terrain concerned, partly on the navigational aids, and partly on the performance of the aircraft when overshooting from such an altitude. It follows that the risks involved in overshooting on instruments from altitudes lower than this optimum break-off height naturally increase the lower the aircraft comes, since the margin for some failure on the part of the aircraft or error on the part of the pilot is progressively reduced. A radio aid designed to bring a pilot right down on the runway and to keep him on it after touch-down, still on instruments, must therefore be able to guarantee that the aircraft with its 50 or 60 passengers will be able to complete its landings every time, and that the risk of a baulked landing, either from pilot error or from malfunctioning of the radio aid, will be negligible.

The development of such aids to the point where they could be used regularly by civil passenger-carrying aircraft, and when the airborne equipment will be sufficiently easily maintained and reliable, is clearly a big and long task. For what it is worth (continued the lecturer), my personal opinion is that, however desirable blind landings may be, at the moment the air-transport industry would benefit more if priority were given to developing facilities and procedures for reducing I.F.R. landing intervals down to the order of 1½ or 2 min. Two-minute landing rates have already been achieved from time to time both in the United States and the United Kingdom, but their achievement over a limited period is not quite the same thing as maintaining them regularly over a long period.

Both I.L.S. and G.C.A. are very expensive and there are instances where the density of traffic at a particular aerodrome does not really justify use of this equipment, but where the air services concerned—which may only amount to about six or eight movements a day—are of particular importance to the local communities. Depending on local conditions, one measure has been to install non-directional M.F. beacons on which the aircraft can make instrument let-downs with the use of A.D/F. Unfortunately, the congestion on the M.F. band is too great to permit the number of installations desirable, and other means must be sought. A promising means of meeting the requirements for an inexpensive cloud-breaking and instrument approach aid is a ground installation combining a simple search radar on 3 cm, using an "A" scope, with V.H.F. direction finding. The addition of distance measuring information to the ordinary D/F. let-down or QGH procedure should enable aircraft to position themselves sufficiently accurately to complete their approaches in visibility conditions considerably lower than those that will be suitable for a D/F. let-down and approach only, though naturally not so low as those achievable by the use of I.L.S. or full G.C.A. A model of such an aid has already been produced as a private venture and, with certain modifications, it seems promising for the purpose outlined previously. [See page 182—Ed.]

Special Aids to Control

The continuing development of air-traffic control requires a number of new aids for specialized functions. Three or four examples will be given as an instance of the field to be covered.

It is well known that there is an inverted analogy between the problems of air-traffic control and those of intercepting a hostile aircraft, the inversion arising from the fact that air-traffic control clearances are based on calculations leading to the assumption that the particular clearance concerned will lead to an *avoidance* of other aircraft by a required margin. A computor is needed to work out the take-off clearance for an aircraft in order to avoid conflict with aircraft inbound or taking off from other airfields at about the same time. This means that information must be fed in, derived from previous flight plans and in-flight information, and the computor must either provide the details of the safe clearance for the next flight or must indicate whether a proposed clearance will be dangerous or safe when details of this clearance are in turn fed into it.

The requirement quickly becomes more complicated. It will be apparent that the information fed into such a computor does not remain valid for long but must be kept up to date. Aircraft do not keep to their flight plans; sometimes they change them involuntarily and sometimes by request. This means that the flow of information to the computor must be continuous. It is unlikely that it will be practicable to feed in this information manually, from information received by R/T. during flight, and the alternative is to provide it continuously, probably by radar

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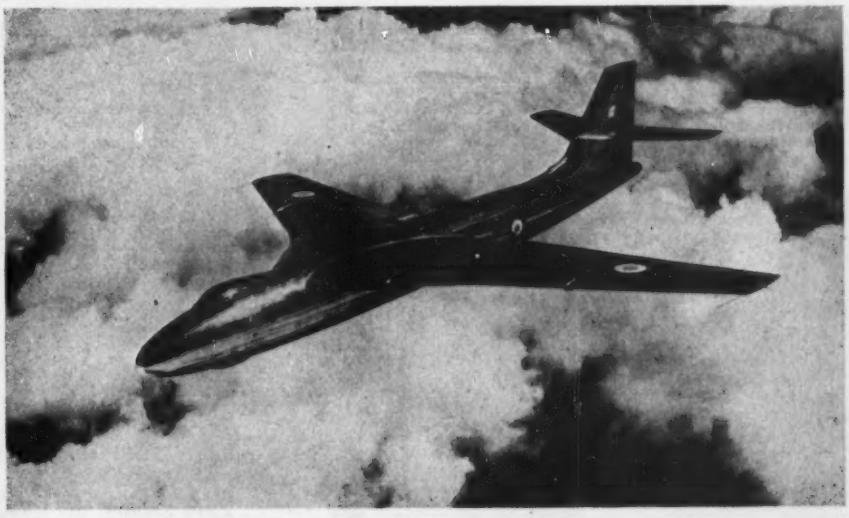

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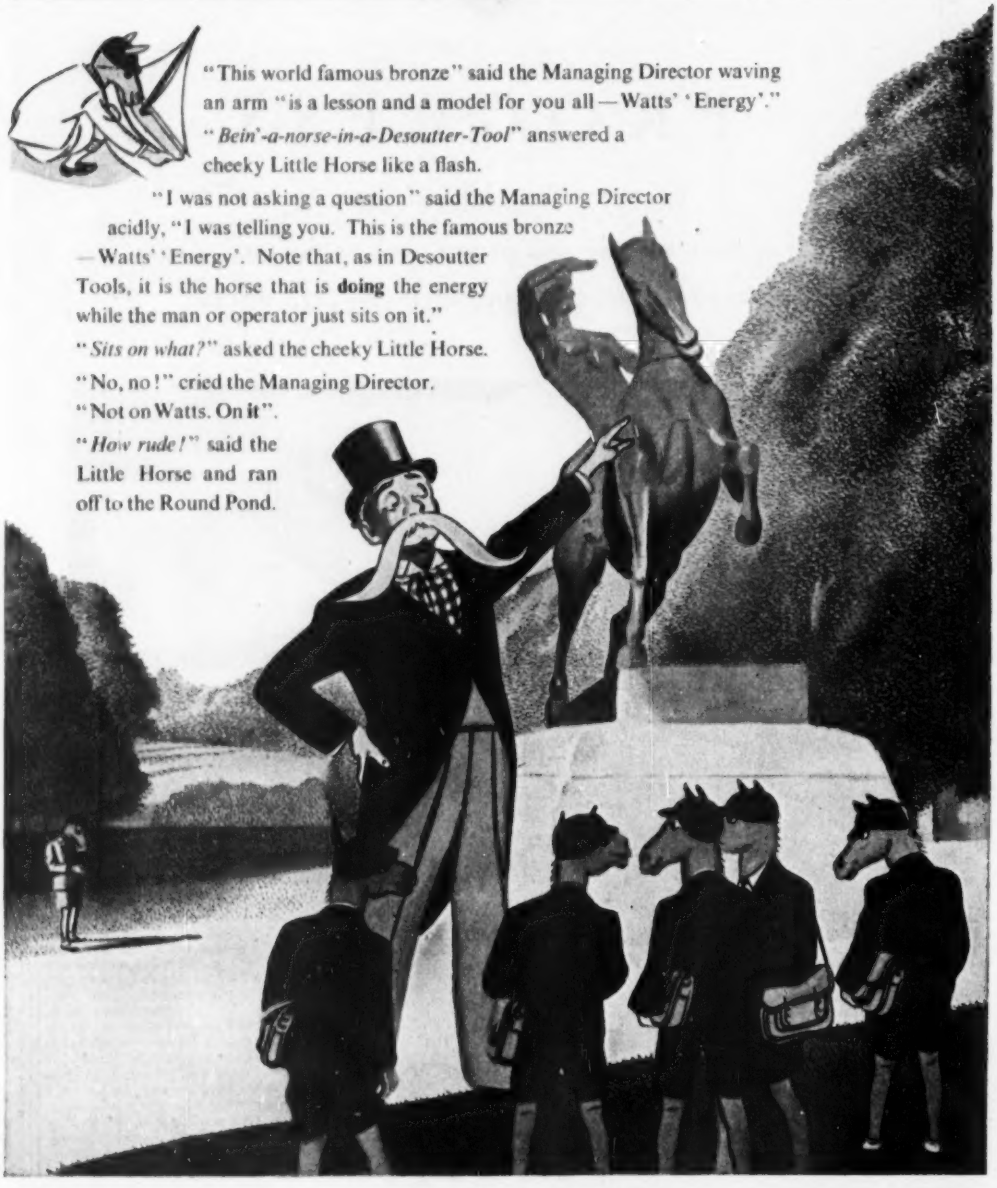
"*Bein'-a-norse-in-a-Desoutter-Tool*" answered a cheeky Little Horse like a flash.

"I was not asking a question" said the Managing Director acidly, "I was telling you. This is the famous bronze—Watts' 'Energy'. Note that, as in Desoutter Tools, it is the horse that is **doing** the energy while the man or operator just sits on it."

"*Sits on what?*" asked the cheeky Little Horse.

"No, no!" cried the Managing Director. "Not on Watts. On it".

"*How rude!*" said the Little Horse and ran off to the Round Pond.



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RADIO and TRAFFIC CONTROL . . .

surveillance. Such a computor—which would amount, in fact, to a basic component of an automatic air-traffic control system—would have to be introduced as part of a system and might well be difficult to incorporate on its own into existing systems. Nevertheless, the ultimate need remains, even though meeting it may be very expensive indeed. So far as civil aviation is concerned, this need has received less publicity in the United Kingdom than it has done in the United States through the medium of the S.C.31 Report; but obviously it is not of interest to civil aviation alone.

Another need is for a form of automatic communication between certain control centres and approach controls. As soon as the movement-rate builds up, it becomes more than ever important that aircraft from the Airways should reach the stack at the lowest free altitude in order to reduce their transit times to the runway. At present the information is obtained by telephone, but this adds to the noise-level in control rooms, increases the strain on the A.T.C.Os. and has in it the risk of error, in so far as any human organization is fallible. One American method—admittedly not radio but electrical—is known as the G.R.S. interlock system; it consists of an apparatus (with displays in each control room concerned) showing altitudes in the stack, with three coloured lamps opposite each. A controller wishing to obtain an altitude for which no light is showing presses a button which "interrogates" the display at the other end and, if no reservation has been made there, indicates that the altitude is reserved at the transmitting end. The M.C.A. air-traffic control experimental unit is now observing and analysing the sequence of events in the control rooms concerned, in order to get more accurate information on the requirement.

A third need is the production of simulators and recorders for training and research purposes. Records of displays during G.C.A. approaches could be used partly for training, partly as a check on the efficiency of the controllers or the pilots concerned and partly, if required, for the investigation of an accident. No display recorders are yet available in this country, but the probable method will be by a continuous photographic record of the radar display, which could be integrated with the R/T record.

Aids Over Sparsely Inhabited Territories

To give an idea of the distances involved on longer stages, it may be said that the South Atlantic route between Dakar and Natal is something under 2,000 n.m., the Colombo-Singapore stage nearly 1,500, and the stage across the Sahara from Tripoli to Kano about 1,250. The drawback to astro-navigation lies partly in its dependence on the weather and partly in the fact that the positions take a little while to obtain and are not sufficiently accurate to provide a very frequent means of checking ground speeds. The provision of a more accurate radio or radar navigational aid is required, not only to meet this shortcoming and to reduce the strain on the crew, but also to provide a better means of checking the progress of flight at very high altitudes. The quickest means of enabling an aircraft to check on its wind forecast and to take avoiding action if it encounters a high altitude "jet stream" would be to provide it with a continuous indication of position and ground speed. [The lecturer here reviewed shortcomings of existing aids in such circumstances, and pointed out that the problem was under continuous study by the member-states of I.C.A.O.]

The navigational problems on the short routes or around the airfields of many overseas territories [he continued] are different from those previously reviewed in connection with the very busy air terminals in continents such as Europe. At certain places abroad, notably Hong Kong, the requirements are stringent because the air traffic is fairly dense and the local territory extremely difficult; but at most places the traffic movements are fairly light and the basic navigational problem remains the original one of navigating from one airfield to another, rather than of having to comply accurately with a detailed clearance from air-traffic control. Although good service is obtainable from such bearing aids as the non-directional beacon, in considering long-term improvements it is desirable to think in terms of a position-indicating system, particularly since in some territories a forced landing could have serious consequences if the whereabouts of the aircraft were not quickly known.

From this point of view, there are obvious attractions in "point-source" aids like V.O.R./D.M.E., sited on the airfields concerned. However, if even the major operators in the wealthiest parts of the world are having second thoughts about the economies of completely equipping their aircraft with this system, it is even less likely that overseas operators of smaller aircraft will use it. The conventional Decca Chain, as known in Europe, suffers from the administrative disadvantage of requiring its master and slave stations to be sited some distance apart—which, in certain territories, could cause difficulties. However, an application of Decca, known as the Integrated Track Range, was tried out with success in this country earlier this year, and its stations, which consisted of two about three miles apart and one at a distance of about 200 miles, could be sited on or as close to airfields as flight-path clearance would permit. Aircraft equipped with ordinary Decca receivers and the Flight Log, or even without the Flight Log, could obtain position information over a large area, which would come in extremely useful when circumnavigating storms or making special flights, as well as during normal operations. The equipment would be no less useful to transit aircraft coming from more populous areas where Decca was the basic aid.

At many places abroad I.L.S. is required, either because of the frequency with which low visibilities occur, or because, if aircraft have to carry enough fuel to go to an alternative airfield, the reduction of payload becomes excessive because of the distance involved. At other places, such as up-country airfields, there is an obvious attraction in the idea of the simple radar-D/F. system mentioned earlier.

The need for a completely airborne type of navigational aid arises not so much from conditions on the ground as from the weather conditions encountered over some of these territories. Airborne search-radar, formerly known as "cloud and collision warning" has been developed to the requirements of M.C.A. and B.O.A.C. and, following extensive trials sponsored by M.C.A. (and carried out by B.O.A.C. in a Hythe flying-boat and a Viking, both in this country and in South-East Asia) it has been adopted by B.O.A.C. for use on some routes. The equipment consists of a primary airborne search-radar giving a P.P.I. display and operating on a frequency of 3 cm. It provides an indication of the direction and distance of the areas of main turbulence, which are generally, though not always, airspaces in which the moisture suspended in the up-currents of air is in larger droplets, giving a brighter return on the radar tube. Flight records, and photographs of the displays on the tube when approaching cloud formations, provide a striking illustration of the way aircraft may be manœuvred round or between areas of turbulence, even though the pilot may be flying on instruments all the time. An additional advantage of this aid is that it provides a degree of "ground painting" which should be of considerable value over mountainous regions and on those routes with occasional landmarks such as coastlines, islands, or large rivers, whose presence cannot be detected visually through cloud.

A general need, which is not confined to operations in sparsely inhabited territories, is for a cheap form of terrain-clearance indicator. Again and again crashed aircraft have been found within a few feet of the summit of the mountain they hit in flight, and in many instances the pilot might have been warned in time to take avoiding action if his aircraft had carried some form of clearance-indicator. Radio or radar altimeters are expensive and sometimes raise installation problems as well, so that their general adoption is slow. If, however, some much cheaper form of T.C.I. can be produced—which would not need to give an accurate and continuous indication of height above terrain so much as an indication of when the aircraft was within a pre-set minimum clearance—it might well be adopted on a wide scale. Some work has been done in this direction, but no equipment to meet the requirement has yet been developed to the stage when it can be demonstrated in flight.

Communications

The need for the provision of faster fixed communications obviously increases with the speed of aircraft, since a departure signal to company or air-traffic control at destination is not of much value unless it reaches them well before the aircraft comes within their sphere of action. This, however, is more a matter for the deployment and application of existing types of facilities and for improvements in procedures than for the development of entirely new equipment.

In the case of mobile communications, the congestion already experienced on V.H.F. is being reduced by a steady programme for increasing the number of frequencies in use, coupled with a constant drive to improve the standard of R/T. phraseology. However, the possibility has been raised that, when traffic movements exceed a particular density, the method of communicating by R/T. will prove too slow and cumbersome in the terminal area and will ultimately limit the movement-rate. The methods proposed for replacing R/T. are some form of symbolic display operated in the cockpit by signals transmitted from the ground, and *vice versa*. It is not yet clear whether a sufficiently wide range of instructions could be provided in a display that was not too cumbersome, or how one could check that the correct information had been received or obtain a timed record of what has been passed and received. Another method, suggested in the American Report S.C.31, is what is known as the "private line" system. This was visualized as a component in an automatic traffic-control system which would communicate with aircraft in selected blocks of airspace without knowing their identity and without requiring

RADIO and TRAFFIC CONTROL . . .

the co-operation of their navigational equipment; would transmit information derived from the aircraft to other elements in the sequence of automatic control equipment; and would automatically transmit back to the aircraft the clearances obtained.

Estimates of probable traffic-densities in this country, R/T. frequencies available and the minimum to which essential R/T. communications could be cut in the landing sequence, lead to the conclusion that the use of R/T. should not prove the limiting factor in the movement-rate for a very long time, and that priority needs to be given to the development of other equipment first.

Requirements of Turbine-engined Aircraft.—For over a year the M.C.A. has been examining the requirements for the successful introduction of turbine-engined aircraft. This work has culminated in a series of flight trials with a Comet lent to B.O.A.C. last summer and it is fairly safe to say that, given a period in which the numbers of jet aircraft will increase steadily rather than by leaps and bounds, they raise a few problems peculiar to themselves, but serve rather to high-light difficulties under which piston-engined aircraft are already labouring in existing systems.

One decision called for in the operation of all high-altitude transport aircraft is when to begin the descent from cruising altitude. If it is begun too late, an extended let-down will be required near or over the destination, with consequent loss of time and efficiency. If it is begun too early, the fuel consumption of the jet aircraft will be increased by the unnecessary time spent at low altitudes. Present thinking favours a gradual descent from cruising altitude beginning about 150 miles from destination and proceeding at normal rates down to about 20,000ft, at which altitude the cabin pressure will be equivalent to sea level. A more rapid descent may be made through the last 20,000ft, the rates of descent varying over fairly wide limits, but dependent to some extent on a comfortable floor-angle for the passengers.

At the moment, appropriate navigational aids for the initial positioning would be Decca or, in sparsely inhabited areas, the Decca Integrated Track Range referred to previously, or D.M.E. on 200 Mc/s or 1,000 Mc/s. It may be mentioned that the M.C.A. has already sponsored the temporary installation of prototype D.M.E. at Rome and at Cairo in order to obtain experience of its efficacy when used by B.O.A.C.'s Comet aircraft. The heading facility, obtainable on British D.M.E. receivers, is regarded as a useful additional asset.

The need for rapid fixed communications to serve flights by very fast aircraft has been mentioned previously. On the air/ground side, the range of communications of V.H.F. will be extended considerably at jet cruising altitudes with a corresponding increase in the area of interference. As an interim measure, it is intended to use special frequencies in the United Kingdom and Western Europe, and it is expected that the problem will be reduced when additional frequencies are brought into operation in the future.

For efficiency and economy, weather diversions should be decided on before the aircraft has descended from its cruising altitude. This means that a flight watch on meteorological conditions at the destination airfield and its alternatives should be maintained throughout the flight by the main meteorological office concerned, and it should be practicable to get the latest met. information through to the aircraft as quickly and as often as required. In addition, a flight watch will probably be maintained by the operators in order to pass operational information and advice to the aircraft in flight. Both these requirements point to the desirability of long-distance R/T. facilities on H.F.—a need which has already been recognized and met on certain routes operated by piston-engined aircraft. Finally, the need for information on conditions in the upper atmosphere, particularly winds and temperatures, is important; and this will be reflected in the need for more "Rawinsonde" stations.

The American Approach

In the space available in this paper, only limited reference is possible to American thinking on these general problems, but this paper would be incomplete if it did not refer to the celebrated S.C.31 Report. The report appeared in 1948 and its preparation required the efforts of 85 experts and cost about $1,000,000. The grandiose scale of its recommendations was staggering. Put very simply, its objective was to raise movement rates under all weather conditions to those obtainable under V.F.R. conditions, which can be very high indeed when separation in the landing sequence is largely left to the continuous visual information available to the pilot. Among the principles required to achieve this objective, S.C.31 laid down that information to be used in traffic control should be derived from ground equipment, whereas information to be used in the aircraft should be derived from airborne equipment; that safe separation of aircraft should be provided by automatic means and the flow of traffic should be controlled automatically; and that human operations should be reduced by mechanical or electronic means whenever possible. The latter devices were to be interlocked, so that they could not be misused or automatically set up a hazardous situation, and to operate on the "closed circuit" principle with "fail safe" indications of malfunctioning. The system should indicate when and where aircraft could be inserted into an existing traffic flow and should automatically transmit to the aircraft and display before the pilot traffic control clearance. These are but a selection from the requirements specified and they were to be met by some 20 different classes of equipment, including monitoring devices. The committee visualized that achievement of the ultimate plan would be *via* a transition plan. The cost was estimated at over $1,100,000,000.

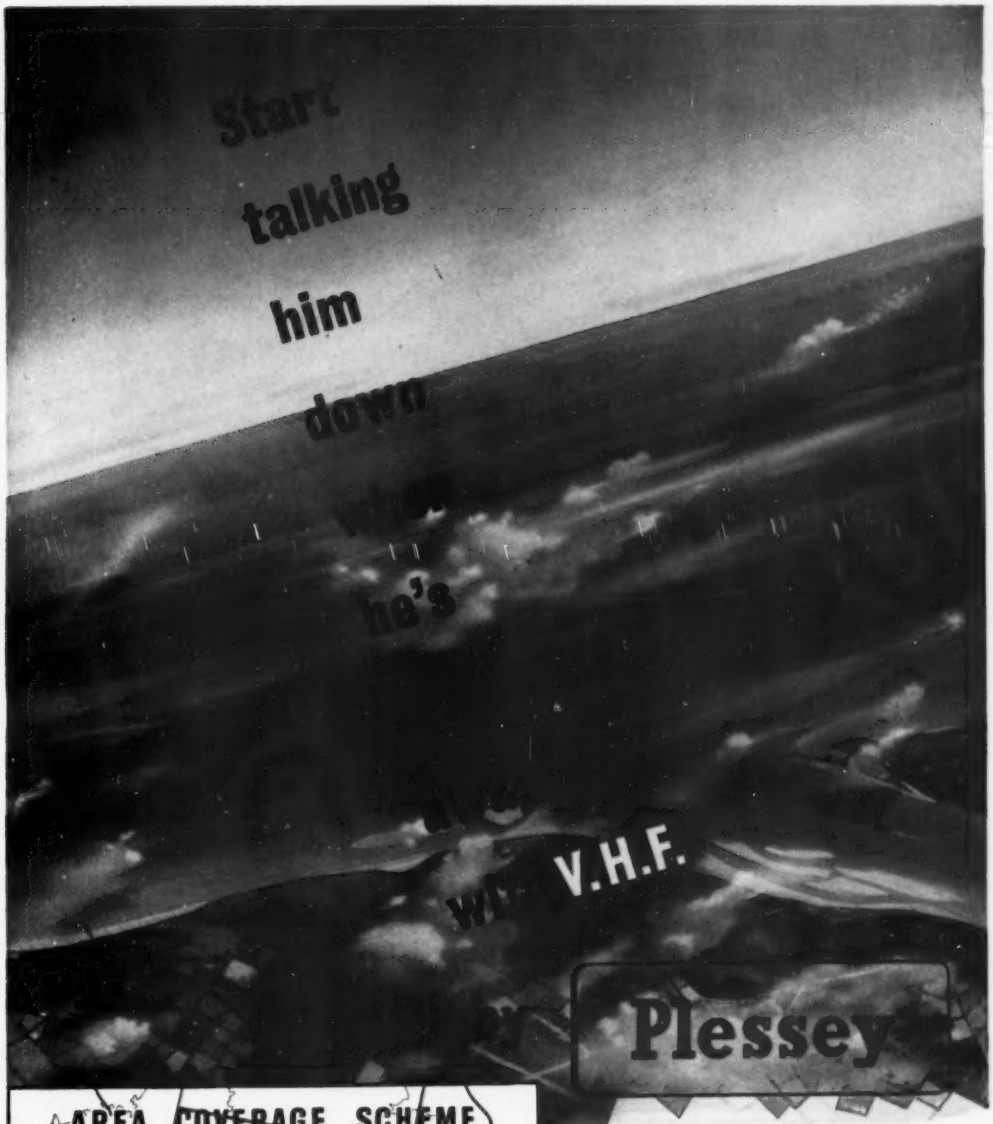
There are signs, however, that realization of the tremendous cost and effort involved in relation to the finances of the air transport industry, and the changed situation in the United States as the result of rearmament, have led to the time scale in S.C.31 being changed—and, apparently, some of the basic assumptions also. From such subsequent reports as that of the operational policy group of the Air Co-ordinating Committee issued last December, it looks as though the U.S. is now prepared to spend a much longer time in a transition phase and to take the experience gained during this period more into account when balancing the requirements and practicability of the ultimate plan. In particular, it looks as though they now hope to make use of V.O.R. for a much longer time and are resigned to the probability that for economic reasons they will not be able to rely on most aircraft being equipped with D.M.E. for several years. They are as convinced as we are of the value of surveillance radar in the terminal areas and are considering its application along their airways. Like ourselves, they are pressing ahead with the development of transponders suitable for civil aircraft for identification purposes, and are providing I.L.S. and G.C.A. for instrument approaches. The most noteworthy differences of opinion between American and British thinking on these problems is, firstly, that the U.K. believes V.O.R. will prove inadequate for the densities and types of traffic to be encountered in a few years' time; and secondly, that the U.K. foresees the growth of cross-country helicopter services, and the consequent need to provide navigational aids for them, whereas some Americans at least consider that helicopters will only be used for local services serving districts around and in large cities.

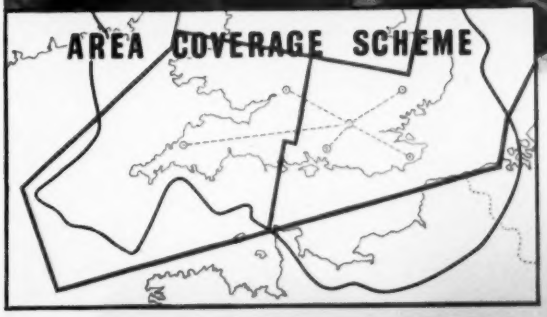
Universal Standardization of Aids

Discussions on standardization of aids, such as those of the divisions of I.C.A.O., tend to think of areas where the problems are most acute and to specify aids with those particular areas in mind. Experience has shown, however, that insistence on installing throughout a long route all the aids required at the busiest terminal on that route will make extravagant and unjustified demands for the provision of facilities at some staging points where the traffic is very much less and the general weather conditions may be very much better. Furthermore, at such places the needs of the local operators of feeder lines may be for equipment that can be carried in small aircraft and is lighter and less bulky than the equipment that can be accommodated in the large long-range aircraft. In these circumstances, the aids supplied at the small aerodromes should be usable by aircraft carrying the more comprehensive equipments without necessarily emulating the full scale of services provided in really busy areas.

The exact selection must depend on the local conditions, and also on the proportion of traffic coming from long-haul operators, but the objective should be to decide on what is to be the highest common factor of equipment along the routes. It is, of course, arguable that it is a hardship for the long-haul operator to carry a comprehensive range of navigational equipment for a long way and at some cost in space and payload if, for a large part of a route, he cannot utilize much of his equipment for improving the efficiency of his operations. On some routes, however, the only bad-weather areas where traffic is really dense exist at the ends of the route. In these conditions, it may be practicable for an aircraft to off-load some of its equipment at the first stopping place after a busy area and to pick it up ready for use at the same point on its way back and before entering the congested region. Such a procedure is already in use by some ocean-going ships for the highly accurate navigational aid employed when close to certain coastlines and for entering harbours, but not when crossing the oceans.

In conclusion [said Mr. Stallibrass] there is no doubt that equipment and procedures in use today enable regular services to be maintained as a routine in weather conditions that, before the war, would have confined operations to the occasional exploits of "intrepid birdmen". The emphasis on shortcomings has only been made here because one of our silvest temptations is complacency and, for those close to the problem, the rate of progress should always seem maddeningly slow in relation to the ideal objective.





Long distance control by V.H.F. is made possible by 'area coverage' which can be designed to meet the particular requirements of any territory.

Plessey were entrusted by M.C.A. with much of the technical development for the British area coverage scheme. This map shows that section of the scheme controlled from Uxbridge, five transmitter-receiver stations giving complete coverage of Southern England and part of Europe. Overseas Governments concerned with air traffic control problems are invited to write for publication No. 491

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HOMECOMING: B.O.A.C. Argonaut "Atalanta," bearing the Queen and the Duke of Edinburgh, taxies in at London Airport on February 7th after its historic flight from Kenya. The journey from Entebbe was accomplished in 19 hr 43 min, with one stop—at El Adem.

CIVIL AVIATION

THE QUEEN'S RETURN

THE B.O.A.C. Argonaut *Atalanta*, carrying Her Majesty Queen Elizabeth and the Duke of Edinburgh, touched down at London Airport at 1619 hr on February 7th, having completed the 4,127-mile flight from Entebbe to London in 19 hr 43 min. Under the command of Capt. R. G. Ballantine, *Atalanta* had left Entebbe Airport in clear weather at 2047 hr G.M.T. on the evening of February 6th. The next signal received in the B.O.A.C. operations room at London Airport showed that at 2200 hr the aircraft was flying at 11,000ft, 214 miles N.N.W. of Entebbe. During the next half-hour it climbed to 16,500ft and at 2330 hr was flying 17 miles S.W. of Juba, in the Southern Sudan. At midnight, cruising at 238 m.p.h. in clear sky, *Atalanta* was reported 105 miles west of Malakal and two hours later it had covered 1,174 miles from Entebbe and was now 320 miles W.N.W. of Khartoum. By 0300 hr the Argonaut had logged 1,434 miles and was then on schedule 325 miles S.W. of Wadi Halfa. It was 550 miles from El Adem at 0400 hr and was cruising at 265 m.p.h., still at 16,500ft.

Having flown 2,360 miles of its journey, the aircraft landed at El Adem 9 hr 25 min after taking off from Entebbe. After refuelling, the machine, now commanded by Capt. R. C. Parker and with a new crew, took off at 0710 hr and headed across the North African coast and out over the Mediterranean. Almost an hour after take-off, it reported its position as 168 miles N.W. of Tobruk, at which point it had again reached a cruising altitude of 16,500ft. *Atalanta* was 300 miles N.E. of Malta at 0900 hr, flying at the same speed and altitude, above cloud; at this time it was 420 miles on from El Adem and still on schedule.

Maintaining the same altitude, and now flying between layers of cloud, the aircraft was 159 miles south of Taranto at 1000hr, with a speed of 219 m.p.h., and 1,247 miles from London. An hour later it was flying 49 miles south of Naples, still between layers of cloud, and close to the Italian coastline; it was then 797 miles on from El Adem.

During the next hour *Atalanta* started to climb—in preparation for the crossing of the Alps—and at noon was flying over the sea 115 miles N.W. of Rome at 18,500ft and at a speed of 207 m.p.h. At this time Capt. Parker reported that the weather was perfectly clear, with no cloud. At 1300 hr, with 594 miles to go to reach London Airport, *Atalanta* was flying at 18,500ft, 73 miles north of Nice, and an hour later was 31 miles S.E. of Dijon, at a height of 16,500ft and above cloud. At 1500 hr the altitude had been decreased to 14,500ft and the Argonaut was 17 miles east of Paris, flying at 173 m.p.h. and with only 227 miles to go.

At 1530 hr *Atalanta* reported from Abbeville at a height of 6,500ft and, after crossing the English Channel, the next report came at 1556 hr, when the aircraft was over Ashford at 6,000ft. Capt. Parker then descended to 4,000ft over Sevenoaks and, reached Epsom, for his approach, at 3,000ft. The Royal aircraft touched down, as stated above, at 1619 hr and came to a standstill at the alighting point at 1630 hr, as planned.

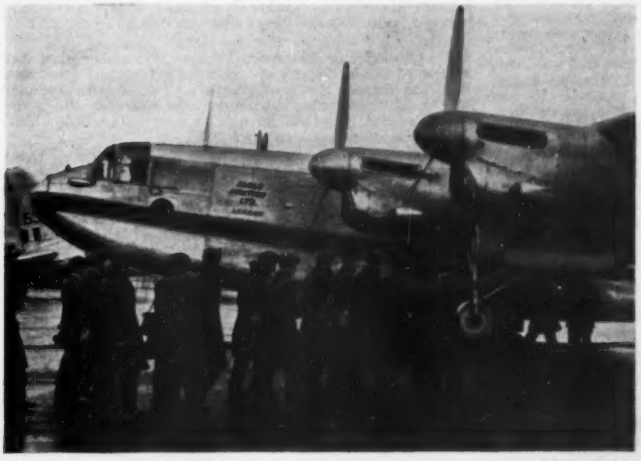
This flight is not so much historic in the usual aeronautical sense as in the wider one that it will be recorded in English history-books hundreds of years hence. That it should have been organized at such short notice, and accomplished with such speed and accuracy, speaks volumes for the efficiency of B.O.A.C.'s operations and ground organizations, quite apart from the typically good work of the crews themselves. In addition, of course, it is a well merited tribute to the sturdy Argonaut. The sterling service which this type has given to B.O.A.C. has shown that in many respects the Argonaut fleet has been the foundation-stone on which most of the Corporation's good progress in post-war years has been based.

AMERICA'S JET TRANSPORTS?

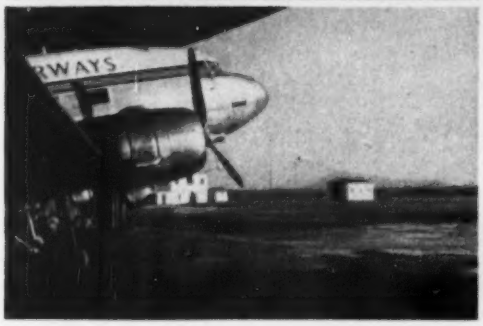
THE oft-debated question of exactly where the United States now stands in jet-transport design, and at what commercial disadvantage her airline industry has been placed by Britain's acknowledged lead in this field, was again given an airing when Mr. Peter Masefield, B.E.A.'s chief executive, visited New York and addressed a meeting of the Institute of Aeronautical Sciences. The following is a summary of some of the views expressed on both sides of this highly controversial fence.

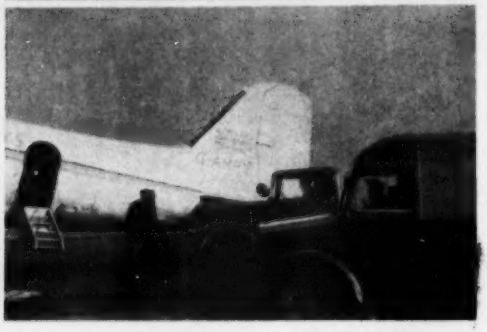
In the opinion of American experts, turboprop aircraft—which some U.S. aircraft designers consider to be the intermediate step between the piston-engined machine and the turbojet—are still five to ten years away, although it was generally agreed that Britain is far ahead in their development. (The U.S. aircraft industry, however, is working on engines of greater power.)

Taking a peep into the future, Mr. Peter Masefield predicted larger commercial jet airliners than those of which the public is now thinking, considerably larger turboprop transports and multi-engined helicopters. "One of the chief problems facing the world's commercial airlines today," he



TROOPING CONTRACT: These R.A.F. passengers, at Lyneham, were the first carried by Eagle Aviation under their new two-year contract in connection with the Empire Air Training Scheme in Southern Rhodesia. Central African Airways' Vikings take the men on from Livingstone to Bulawayo.





WINDY WEATHER: Although the recent outbreak of storms, and even hurricanes, in the northern isles of Scotland confronted B.E.A. with unusual hazards, relatively few of the inter-island services had to be cancelled. (Above, left) A Rapide needs wing-tip assistance while taxying at Grimsetter. (Above, right) Pionair R.M.A. "Frank Barnwell" taking off at Sumburgh. (Below, left) Safety is found in the hangar at Benbecula; note the horizontal wind-sock. (Below, right) Unloading at Benbecula after Pionair R.M.A. "Richard Howard-Flanders" had battled against a 68-m.p.h. head-wind during its flight from Renfrew. The built-in passenger-steps are actually lifting in the wind.

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said, "is to reduce the seat-cost per mile." U.S. observers, it seems, interpreted these remarks as meaning that the Comet is too small and too short-ranged for profitable overseas operation.

Mr. Masefield told the Institute that a combination of the pure jet and the turboprop was a very interesting prospect for the future which is already being closely examined. In such a combination, airscrews would be used for take-off and then feathered, the pure jets being used for the rest of the flight.

Mr. Raymond Young, president of Reaction Motors, Inc., maintained that turboprops now being flown experimentally in the United States showed no great gain in speed over piston-engined aircraft. To obtain appreciably higher speeds from the turboprop, he said, it would be necessary to develop an engine of about 6,500 h.p. The extremely heavy cost of developing such a unit would therefore compel the airlines and aircraft manufacturers to wait until the Armed Forces produced such a model; but, again, the Services usually kept such developments for their exclusive use for the first four or five years.

Other speakers at the meeting suggested that some of the large airliners now being built—and claimed to be suitable for conversion to turboprop operation at a later date—would have outlived their usefulness by the time the new power plants were ready.

The views of M. Gilbert Perier, president of Sabena, were based on the opinion that in ten years' time the U.S. will have caught up with Britain in building commercial jet transports and that transatlantic fares will have been reduced by a half. "By that time," he said, "U.S. aircraft builders will be the major suppliers of all-jet commercial air fleets encircling the world."

He said that his own company had originally planned to order British jet aircraft for use on its routes within the next year, working on an 18-month delivery basis. The heavy requirements of Britain's rearmament programme, however, had delayed the prospect of such deliveries for three or four years.

"By that time," he said, "we expect that the Americans will have given us something good in jet aircraft."

In ten years M. Perier will have been proved right or wrong. Meanwhile, the fact remains that, if we are to keep to our lead in jet transports, advanced design alone is not sufficient; rearmament programmes or not, these aircraft must somehow be built and sold and flown far enough and long enough in commercial service to constitute their own advertisement.

B.O.A.C.'s FINANCIAL PROGRESS

FOR the nine months from April to December last (the first three-quarters of the current financial year) B.O.A.C. had a surplus of £505,000—the first time that an operating profit has been achieved in such a period. In the corresponding period of the previous year there had been a deficit of £3,157,000. The actual operating profit amounted to £1,685,000, from which £1,180,000 has to be deducted to repay interest on capital and other costs. In the calendar year 1951 an operating profit of £641,000 was realized; nevertheless the total net deficit was £903,000.

Although the results up to December are satisfactory, B.O.A.C. will still have to face the two worst traffic months of the year, January and February, and it is a debatable point whether the Corporation can keep the losses in the first quarter of 1952 under the £505,000 mark in order to achieve the great satisfaction of their first operating profit for a full financial year.

Whatever the ultimate result, however, the figures to date are extremely encouraging and serve as an indication of considerably increased efficiency in the Corporation itself. We hope to include a more detailed review of B.O.A.C.'s progress in next week's issue.

BREVITIES

AT a B.A.L.P.A. central board meeting held in London last week, Capt. J. Woodman was elected chairman of the Association for 1952 in succession to Capt. A. Le R. S. Upton, who has served in this capacity since January 1950. Capt. Woodman is a Senior Captain, First Class, with B.O.A.C.

* * *

The Société des Transports Aériens d'Extrême-Orient has contracted to take delivery of four S.O. 30 Bretagnes fitted with Pratt and Whitney R-2800 B43 engines. Two of these machines will be delivered during the summer, the remaining two in the winter months; they will be used on services in Indo-China.

* * *

Speaking of the recent reduction to £25 of the foreign travel allowance, Lord Douglas, the chairman of B.E.A., said last week that he did not think it would prove a grave loss to the Corporation. To mitigate the effects of the reduction, B.E.A. propose to intensify their sales effort on the Continent and encourage more foreigners to visit Britain. Fare reductions to places in the sterling area, such as Gibraltar, Malta and Cyprus, are also being considered.

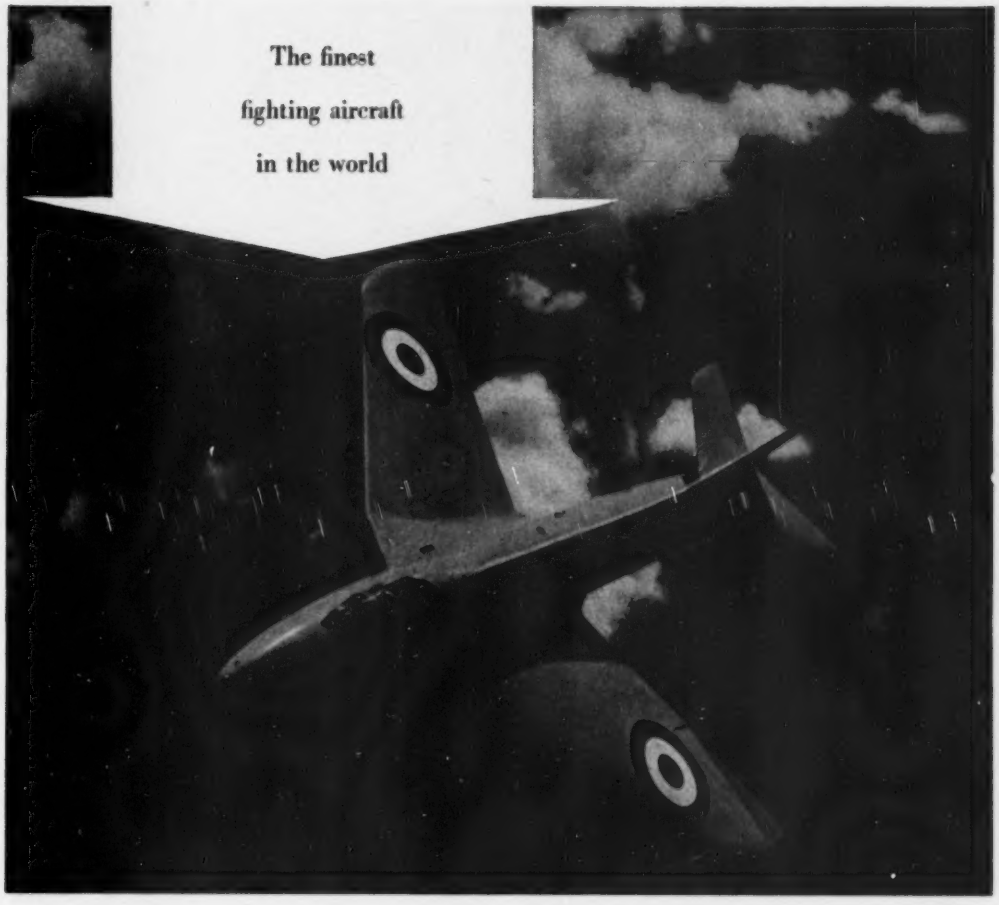
* * *

By agreement with the Government of the Sudan, International Aeradio, Ltd., has contracted to operate all radio facilities at Khartoum Airport and also to provide full air-traffic control and flight information services there. While improvements to Khartoum's runway are in progress, the company will provide certain temporary services at Wadi Seidna.

* * *

Capt. V. Wolfson, O.B.E., V.R.D., left B.E.A. last month to take up an appointment as adviser to the chairman of B.O.A.C., Sir Miles Thomas. An expert on European affairs, Capt. Wolfson

The finest
fighting aircraft
in the world



Hawker **P.1067**

The year 1951 saw British aircraft design establish without question the leadership of the whole world. Outstanding, even in a year of such achievement, is the new Hawker interceptor P.1067. It is an open secret that this swept-back-wing fighter, with its beautiful thoroughbred lines, repeatedly set new speed records at the Farnborough 1951 show. Against great competition, it was hailed as the number one star. The R.A.F. ordered the P.1067 for quantity production straight from the drawing board, a well-deserved compliment to the Hawker fighter tradition of Hurricane, Typhoon, Tempest and Fury. Like these famous predecessors, P.1067 was designed by Sydney Camm.

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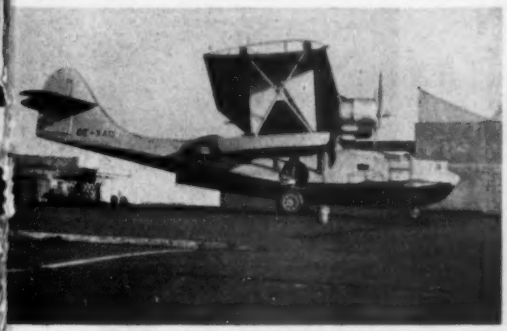

RARA AVIS: A civil type seldom seen in Europe is this PBY-5A Catalina (alias Canso) which, as we mentioned briefly last week, is now being overhauled by Field Aircraft Services, Ltd., prior to its departure for Sweden. It was purchased in Pakistan from Kalinga Airlines by the Swedish company, Helicopterflyg. This particular machine has seen considerable service in the Far East and has been a frequent visitor to Hong Kong Airport.

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will advise the chairman on various aspects of the Corporation's policy in Europe, and he will also be responsible for the affairs of a number of its subsidiary and associated companies. He will continue to hold his position as deputy chairman of International Aeradio, Ltd., and will also remain on the boards of Cyprus Airways, Ltd., and the Société Internationale des Télécommunications Aéronautiques.

* * *

For the exclusive benefit of their air-ferry passengers, Silver City Airways intend to form a "Continental Club," membership of which will enable passengers to stay at selected hotels on the north coast of France at specially low rates. In order to show prospective tourists how motorists or cyclists abroad can take advantage of the air ferry and spend first-class motoring or cycling holidays on the newly-reduced overseas travel allowance of £25, the company has prepared a mobile demonstration unit which is about to tour this country; it is available, on request, to visit business firms and similar organisations whose members might be interested.

* * *

At a conference of Indian internal air transport operators which met in New Delhi recently, agreement was reached on the proposal that 40-seater aircraft of the Vickers Viscount or Convair 340 type should be used on internal trunk routes and also for international flights to neighbouring countries. A sub-committee has now been set up to decide which particular type will be purchased and how the purchase will be financed. Most of the country's airlines are using Dakotas which, for the most part, are fairly low in flying hours and may last for a further seven to ten years.

R.Ae.C. Aviators' Certificates

WE publish below another of the periodical lists of those who have qualified for Royal Aero Club Aviators' Certificates; it covers the period from November 30th, 1951, to January 10th, 1952. The previous list (October 29th to November 30th, 1951) appeared in *Flight* of December 28th last.

No.	Name	Club or School	Date
27,783	H. H. Glow	R.A.F. Cottesmore	30.11.51
27,784	J. Bruce	Current P.P.L.	30.11.51
27,785	P. L. W. Pressley	Qualified Service pilot	30.11.51
27,786	J. L. Birch	R.A.F. Cottesmore	3.12.51
27,787	W. R. Robertson	" "	3.12.51
27,788	J. A. Farrington	Redhill Flying Club	3.12.51
27,789	H. A. A. George	R.A.F. Cottesmore	3.12.51
27,790	J. R. D'Arcy	Cambridge Aero Club	3.12.51
27,791	R. A. R. U. Hummel	Air Service Training	6.12.51
27,792	H. D. Booth	R.N. Flying Club	6.12.51
27,793	W. A. Poulton	Wolverhampton Aero Club	6.12.51
27,794	G. Purfett	Redhill Flying Club	6.12.51
27,795	J. M. Souster	Wolverhampton Aero Club	6.12.51
27,796	P. J. Walsh	" " "	6.12.51
27,797	R. A. Knowles	R.A.F. Cottesmore	6.12.51
27,798	W. J. Runciman	Qualified Service pilot	6.12.51
27,799	R. W. Hayes	R.A.F. Cottesmore	6.12.51
27,800	J. M. Gardiner	" "	6.12.51
27,801	O. S. Frame	Qualified Service pilot	6.12.51
27,802	E. W. Ginger	" "	6.12.51
27,803	R. E. Brown	" "	6.12.51
27,804	D. Montagu	R.A.F. Syerston	6.12.51
27,805	G. A. Walker	Qualified Service Pilot	6.12.51
27,806	J. R. Young	" "	6.12.51
27,807	H. Fry	R.A.F. Feltwell	6.12.51
27,808	A. R. King	" "	6.12.51
27,809	J. E. George	" "	6.12.51
27,810	R. Endecott	" "	6.12.51
27,811	J. P. Andrews	" "	6.12.51
27,812	P. N. R. Raggett	" "	6.12.51
27,813	J. F. Geekie	" "	6.12.51
27,814	S. E. Hackett	" "	6.12.51
27,815	A. Towle	" "	6.12.51
27,816	R. Downs	" "	6.12.51
27,817	B. H. Roberts	" "	6.12.51
27,818	R. E. Bendeaux	" "	6.12.51
27,819	J. D. Purcell	Qualified Service pilot	10.12.51
27,820	P. F. Knight	Northants Aero Club	11.12.51
27,821	R. A. Brown	R.A.F. Syerston	11.12.51
27,822	O. A. Brown	Qualified Service pilot	11.12.51
27,823	L. E. Keller	" "	11.12.51
27,824	D. C. L. Kearns	" "	11.12.51
27,825	C. P. L. Godsal	Cambridge Aero Club	15.12.51
27,826	J. R. Collingbourne	24 R.F.S. Rochester	15.12.51
27,827	M. M. Harris	York Aviation Services Country Club	15.12.51
27,828	H. H. Skinner	West London Aero Club	15.12.51
27,829	T. W. Aynsley	24 R.F.S.	15.12.51
27,830	J. H. H. Davison	" "	15.12.51
27,831	J. Trouncer	" "	15.12.51
27,832	A. T. Henderson	Qualified Service pilot	15.12.51
27,833	R. O. Simmons	" "	15.12.51
27,834	D. T. L. Bairdow	R.A.F. Cottesmore	15.12.51
27,835	F. J. Morley	Qualified Service pilot	15.12.51
27,836	J. A. G. Ross	R.A.F. Cottesmore	15.12.51
27,837	S. Brisk	Qualified Service pilot	15.12.51
27,838	J. D. Clayton	R.A.F. Cottesmore	15.12.51
27,839	D. J. Kirkup	" "	15.12.51
27,840	D. L. Davies	Qualified Service pilot	15.12.51
27,841	F. E. V. Harder	R.A.F. Cottesmore	18.12.51
27,842	M. J. Garrity	" "	18.12.51
27,843	L. J. Allen	" "	18.12.51
27,844	W. F. Flewith	Qualified Service pilot	18.12.51
27,845	V. N. Cramer	" "	18.12.51
27,846	E. G. Beedle	" "	18.12.51
27,847	J. McPhee	" "	18.12.51
27,848	Leon Ospovat	" "	18.12.51
27,849	J. M. Beaumont	R.A.F. Cottesmore	20.12.51
27,850	S. C. C. Guthrie	Tees-side Flying Club	20.12.51
27,851	J. S. Edwards	Coventry Aero Club	20.12.51
27,853	A. J. O'Connor	Qualified Service pilot	20.12.51
27,853	L. T. Pearson	N. Rhodesia Flying Club	28.12.51
27,854	P. B. Martin	R.A.F. Cottesmore	28.12.51
27,855	D. J. R. Beard	" "	28.12.51
27,856	R. Ashford	London Aeroplane Club	28.12.51
27,857	J. W. Daw	R.A.F. Syerston	28.12.51
27,858	W. L. Garfitt	Newcastle Aero Club	28.12.51
27,859	D. C. J. Summerfield	Plymouth Aero Club	28.12.51
27,860	M. P. Hopewell	R.A.F. Cottesmore	28.12.51
27,861	I. W. D. Dray	" "	28.12.51
27,862	A. T. Cowham	Liverpool Flying Club	28.12.51
27,863	W. W. Ferguson	Qualified Service pilot	31.12.51
27,864	F. A. Budden	" "	3.1.52
27,865	C. G. Stephens	West London Aero Club	3.1.52
27,866	A. J. Oliphant	Strathtay Aero Club	3.1.52
27,867	T. G. Grant	R.A.F. Cottesmore	3.1.52
27,868	C. J. Miller	A.S.T., Ansty	3.1.52
27,869	R. B. Benstead-Smith	Cambridge Aero Club	3.1.52
27,870	A. C. Whincop	Airways Aero Club	4.1.52
27,871	D. R. Mann	Plymouth Aero Club	9.1.52
27,872	R. G. Emmerson	Qualified Service pilot	10.1.52
27,873	J. E. A. Jenkins	R.A.F. Cottesmore	10.1.52
27,874	S. Greenslade	Exeter Aero Club	10.1.52
27,875	M. J. Bywater	Midland Aero Club	10.1.52
27,876	B. Lax	" "	10.1.52
27,877	W. Cooper	Strathtay Aero Club	10.1.52
27,878	P. W. R. Gill	R.A.F. Cottesmore	10.1.52

SERVICE AVIATION

Royal Air Force and Naval Aviation News

R.A.F. FLYING COLLEGE AIRCRAFT RETURN

OF the five aircraft—two Hastings, two Lincolns and the "Lincolnian" *Aries*—which left for world flights from the R.A.F. Flying College, Manby, early last month, all but one arrived back on time on February 7th. The fifth, which had been visiting air and naval bases in the United States, experienced engine trouble over the Atlantic and had to return to Gander, Newfoundland, arriving at Manby a day late.

Altogether, more than 100,000 miles were flown and while one of the Lincolns was basking in a temperature of 116 deg F in the shade at Sydney a Hastings was standing out in 50 below in Alaska. A. Cdre. S. R. Ubee was there to greet each crew on arrival—he was, in fact, making a squash appointment with S/L. Cole within a minute of his landing from Alaska.

Aries, from Japan, was in first—one minute before the E.T.A. at 1030 hr. On the way out S/L. Oakley had made Singapore in two jumps—each of 18½ hr—with a rest of only 4½ hr between. A detour had been arranged for *Aries* to visit Clark Field in the Philippines, but this part of the schedule was cancelled and a direct flight lasting 16½ hr was made to Tokyo.

While in the Far East both the navigators, F/L. Jillings and F/L. Grocott, went on bombing missions in B-29s with the Americans in Korea. These were night operations from 20,000ft, using radar; the Americans have given up day bombing. There was plenty of flak, obviously predicted but not very accurate. The target was 60 miles south of the Yalu river and each B-29 dropped 40 x 500lb bombs.

At Mauripur, Pakistan, S/L. Radley (who captained the Lincoln touring Australia) lost one of his students—W/C. Humphreys, whose medical papers were not in order; they were minus one rubber stamp. The Pakistani authorities insisted on his sojourning in isolation—with 12 Japanese sailors—for nine days, and he caught up with the aircraft at Sydney.

The highlight of this trip was the trip to the rocket ranges at Woomera. Although the party was there for only two days, more than 230 miles were traversed while inspecting the ranges. Woomera now has a civil population of about 3,000 and Service personnel make up another 2,000.

The Hastings coming in from the Alaska-Canada trip had lost both starboard spinners. The worn red paint on the tailplane, fin and wing-tips was also evidence of the severe conditions under which it had been operating. These parts had been painted red to make them more easily seen in event of a forced landing in the snow.

Three of the students went on B-29 flights to the North Pole and two to the Bering Sea. These were weather-study trips lasting 15-20 hr each. The Alaskan team spent three weeks in Alaska, where temperatures fell as low as minus 50 deg F. Two days and one night were spent with only Arctic survival kit to supply food and shelter. Two-man huts were built in the snow by bending thin willow branches into an inverted U and covering the roof, first with a parachute and then with the blue and yellow tarpaulins which form part of the kit. The exercise also included "buddy co-operation"—the local name for avoiding frost-bite by watching for the first signs to appear on a companion's face.

W/C. R. I. K. Edwards reported a trouble-free journey to New Zealand and back, during which three days were spent in Malaya studying air operations against the banditry. The students went on supply-dropping sorties from Kuala Lumpur. The programme had provided for a detour to the Fiji Islands but the area was suffering from the effects of a 120 m.p.h. hurricane and the visit had to be cancelled.

R.A.F. Appointments

FOUR senior appointments are announced by the Air Ministry. A. V-M. D. Macfadyen, C.B., C.B.E., who has recently been Director of Plans and Assistant C.A.S. (Policy) is to be A.O.C. British Forces, Aden. The S.A.S.O. of Middle East Air Force, A. V-M. F. W. Long, C.B., is to go to Flying Training Command as A.O.C. No. 23 Group, and his place at H.Q. M.E.A.F. will be filled by A. V-M. G. R. C. Spencer, C.B., C.B.E. Since February, 1950, A. V-M. Spencer has been A.O.C. No. 19 Group, Coastal Command.

The fourth appointment is that of A. Cdre. H. W. Heslop, C.B., C.B.E., A.F.R.Ae.S., who is to be Senior Technical Officer, M.E.A.F. with the acting rank of air vice-marshal. He has held the same appointment at Bomber Command.

Shackleton Formation Flight

SIX Avro Shackletons of Coastal Command left St. Eval, Cornwall, last Friday for an overseas formation flight to Ceylon. Two stops were made on the way, at El Adem (Libya) and Khormaksar (Aden). Total mileage was 5,300, approximately. S/L. A. E. W. Laband is in command.

The formation is to take part in exercises with the East Indies Fleet.

PERSONAL PRESENTATION: Air Marshal Sir Alan Lees (affectionately known as "Uncle" Lees) presents his trophy for the most efficient squadron of the A.T.C. to F/L. R. B. Stratton, the C.O. of No. 1024 (East Wight) Squadron. F/L. Stratton is chief flight engineer at Saunders-Roe, Ltd., and will fly on the first trials of the Princess flying-boats.

Navigation Exercise

ON the night of February 18th, four Lincolns from the R.A.F. Central Navigation and Control School at Shawbury, Shropshire, are due to start on a training flight to Canada and back. The aircraft will be away for 11 days, during which over 10,000 miles will be flown.

They will proceed *via* the Azores and Bermuda, and will arrive at the R.C.A.F. Central Navigation School at Summerside, Prince Edward Island, on February 24th. The return flight will be *via* Iceland.

W/C. S. G. Baggott, the School's chief instructor, is in command and the captains of the four aircraft are: S/L. J. S. Sherwood, F/L. J. Maxwell, F/L. P. D. Richards and F/L. E. W. Talbot.

Reunions

NO. 2 Group Officers Association, including No. 2 Group units past and present, will hold their fifth annual general meeting and reunion dinner on May 10th. The organizer, S/L. J. A. Beattie, 6, Leamington Road Villas, London, W.11, from whom full particulars may be obtained, asks us to say that the association extends a special welcome to W.A.A.F. officers.

Mosquito aircrews of No. 4 Squadron will hold a reunion on April 4th. Particulars from F/L. K. Utton, R.A.F., Thorney Island, Emsworth, Hants.

JOURNEY'S END: (Left) The Handley Page Hastings which took the Flying College teams to Canada and Alaska touches down at Manby. (Right) "Aries," the Avro "Lincolnian" of polar fame, taxies in past waiting families after flying from Malta.

"Flight" photographs

SMITHS INDUCTOR PRESSURE GAUGE

NEW

(Actual size)

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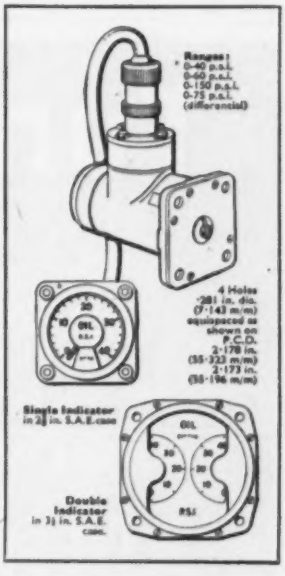

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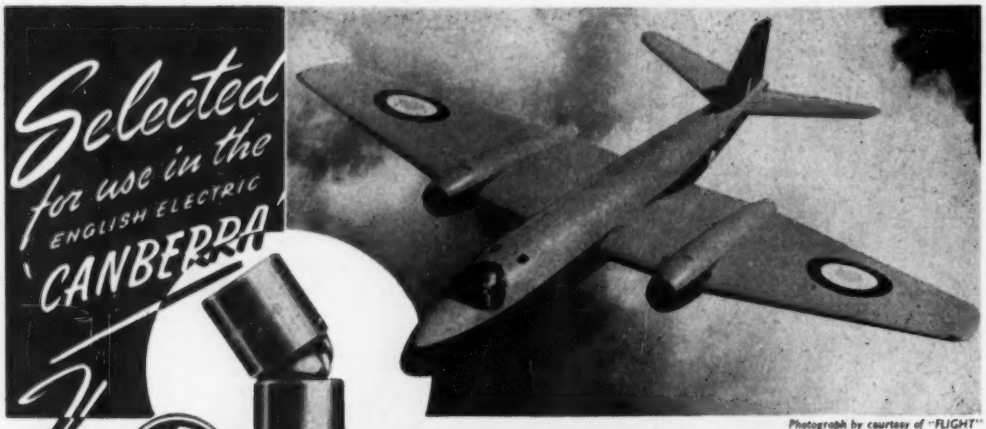

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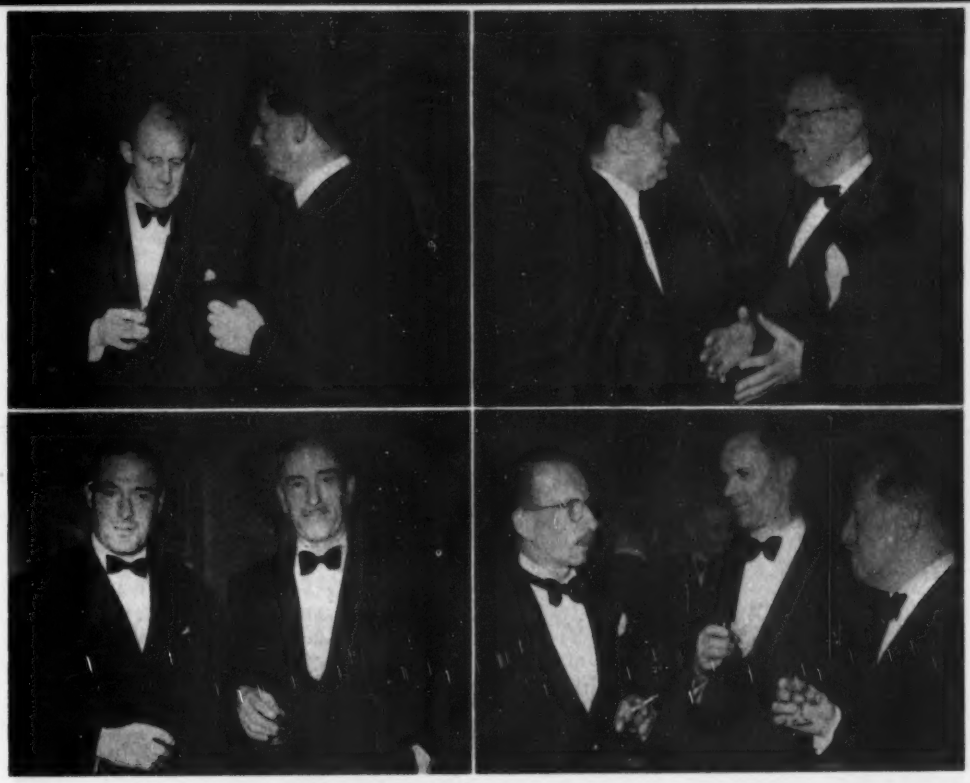

MEN BEHIND THE MIDDLE EAST AIRLIFT

"Flight" photographs

WHEN, as we briefly recorded last week, Sir Frederick Handley Page entertained to dinner crews of R.A.F. Transport Command who had taken part in the airlift to the Middle East, there were present also three A.O.Cs-in-C. of the Command and representatives of the manufacturing companies of the Hastings transport and its Bristol Hercules engines. Addressing his guests, Sir Frederick said: "I do not believe that it is properly realized in this country how much in the modern world you can save by reason of the mobility of air transport." Air Marshal Sir Aubrey Ellwood said: "During this awkward period we are going through, the power to move forces quickly from one place to another may have tremendous influence in what we are pleased to call the cold war."

In the illustrations above are seen (top, left) A.V.-M. C. E. N. Guest, A.O.C. designate of Transport Command (facing camera), with S.L. H. G. Hazelden, Handley Page test pilot; (top, right) Air Marshal Sir Aubrey Ellwood, retiring A.O.C., listening to Sir Frederick Handley Page; (lower, left) A. Cdre. A. V. Harvey, M.P., Handley Page director, with Air Marshal Sir Alec Coryton, managing director, engine division, Bristol Aeroplane Co., Ltd. (hand in pocket); (lower, right) A.V.-M. R. S. Blucke, "caretaker" A.O.C., talking to Mr. R. S. Stafford, chief designer, Handley Page (centre), and Mr. R. L. Ninnes, engine division, Bristol Aeroplane Co. The scene during dinner in the fine old hall of the Worshipful Company of Tallow Chandlers in Dowgate Hill, City of London, is depicted on the left.

THE INDUSTRY

New Partnership at Croydon

THE managing director of Adie Aviation, Ltd., Mr. D. J. Adie, has entered into partnership with Mr. A. F. Muir to form the business of Muir and Adie, Ltd., aircraft engineers and dealers in aircraft and spares, with headquarters at Croydon Airport.

After serving in the R.F.C. and R.N.A.S. in the First World War, Mr. Muir went into the joy-riding business, first with Leatherhead Aviation Services (in partnership with Mr. Chapman), and then with Surrey Flying Services, of which company he was the founder, in 1921. He next went to India as personal pilot to the Maharajah of Patiala. Returning in 1939, he served with the R.A.F. throughout the last war, and was awarded an A.F.C. for flying instruction.

Useful Surplus

AFTER studying the recently issued catalogue of Aero-Spares Co., the Government-surplus dealers of 70-1, High Holborn, London, W.C.1, we are left with the somewhat dazed impression that "if it's available, it's in the catalogue." As examples may be instanced D.R. master compasses at £6; alumina powder at 50s. per pound; mess-tins at 3s.; and any item of airborne equipment, from Chobert rivets at 7s. 6d. per thousand to F.24 cameras at £25 each. Aero-Spares have branches at Elstree Airfield and in St Johns Wood High Street, London, N.W.8, and are prepared to undertake export packing and documentation.

A Really Ghostly Engine

THE Transart process—in which a structure is partially illustrated on each of a number of Cellophane pages, the whole becoming "dismantled" as the pages are turned—has been put to excellent use by Shell-Mex and B.P., Ltd., in a new publication, *The Book of the Jet*.

This highly original booklet includes "A simple account of the gas turbine," by Arthur Elton. Although far from the first such elementary elucidation, Elton's is among the most concise and most readable, besides being so ingeniously illustrated. The engine chosen for dissection is the Ghost.

The booklet is available upon application to the company's aviation department, Shell-Mex House, Strand, London, W.C.2; "frivolous" applications, however, will be discouraged, as the issue is limited.

Honoured by the "Mechanicals"

Mr. J. L. Norton, of the Bristol engine division, who has been awarded the Thomas Hawksley gold Medal for the best paper published in the "Proceedings of the Institution of Mechanical Engineers" during 1951. His subject was "The Design and Development of the Twin Centaurus for the Brabazon." Mr. Norton—son of the founder of the famous Norton motor-cycle business—joined Bristols in 1936, and in 1950 was appointed assistant chief turbine development engineer. He has for some time been responsible for all special engine projects, including the Centaurus installations in the Brabazon and the Proteus in the Saunders-Roe Princess.

Fire-retarding Paint

A NEW fire-retardent paint is being tested as a protection for runways against jet blast, while a further application is the heat insulation of gas turbine test-houses. Known as "Refrac," it is marketed by W. E. Coss and Co., Ltd., of 49, Old Bond Street, London, W.1. "Refrac" coatings, it is stated, have successfully passed D.S.I.R. and Air Ministry fire-tests, and their use raises many fibrous and highly inflammable materials to Class I.

The paint is available for almost immediate delivery in various colours, and can be applied direct to any clean, dry surface, the drying time being a few hours only. It is stated not only to be a good electrical insulator but also to combat condensation, and to be able to withstand temperatures of 1,000 deg Centigrade, although coloured pigments lose their hue at some 550 deg.

Mr. T. Gilbertson, director and general manager of Folland Aircraft, Ltd., presents a cup to C. Norbury, outstanding apprentice (see below).

Folland Apprentices Rewarded

THE Folland Aircraft apprentices' prize day was held recently at the Royal Pier Pavilion, Southampton; Mr. W. E. W. Petter (managing director) presided, supported by Mr. N. Egan (director and secretary), Mr. T. Gilbertson (director and general manager), and Mr. J. Dynan (education officer).

In his opening speech, Mr. Petter stressed that the need for craftsmen was greater today than ever before; apprenticeship was one of the best ways to ensure a full life, as it not only offered a trade, but companionship as well. He was particularly pleased that so many parents within the organization had seen fit to ensure that their sons became apprentices.

In making his annual report, the education officer remarked that in these days of big money there had been a drift away from apprenticeship, but now, with the help of various bodies, youths leaving school were beginning to see the advantages that apprenticeship could offer.

Mr. Gilbertson, in presenting the prizes, said he was happy to be associated with the apprenticeship scheme; he thought that although 140 boys could present a considerable problem, the education department managed them very well and the results produced were excellent. Prize-winners were as follows :—

Preliminary Senior Prize (given by the shop stewards).—M. J. Stone.
S.1. Ordinary National (by the foremen).—P. Holloway.
S.2 Ordinary National (by the superintendents).—A. Amos.
Ordinary National Certificate (by Mr. E. W. Taylor, works manager).—E. Pitfield.
Higher National Certificate for Production Engineering (by the works senior executives).—C. Norbury.
Craftsman's Prize (by Mr. T. G. Gilbertson, director and general manager).—T. Maine.
City and Guilds Production Engineering (by the Sports and Social Club).—N. Murphy.
B.Sc. Prize (by Mr. A. E. Lane, assistant secretary).—A. Molyneaux.
Trade Boy's Prize (by Mr. F. Hamlin, experimental works manager).—L. Hunt.
Integrity Prize (by Mr. N. Egan, director and secretary).—A. Godfrey.
Education Officer's Prize (by Mr. J. Dynan, education officer).—T. Cross.
Outstanding Apprentice Award (by Mr. W. E. W. Petter, managing director).—C. Norbury.

Production on the Move

A NEW feature of *Transport Goods Guide*, in the 1952, Jan-June edition of which is now available, is a section on materials-handling equipment. The eight other sections of this handbook have also been completely revised to provide information on all aspects of freight transport within the British Isles. The guide is available at 2s 6d (by post) from the publishers, Iliffe and Sons, Ltd., Dorset House, Stamford Street, London, S.E.1.

On File

AMONG the many abstracts listed monthly by The Motor Industry Research Association will be found a number of items of interest to aircraft engineers. In the M.I.R.A. index for December, 1951 (abstracts 5600-5639 inclusive) are such titles as, "Automotive and Aircraft Sealers," "Integral-finned Tubing for Heat-exchangers," and "Tyre Examination: Ultrasonic cavity-detection equipment." The Association hold most of the original articles in their library at Great West Road, Brentford, Middlesex.

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OF the nine stock aeroplanes offered by us last week, four—an Autocrat, an Auster V, a Moth Minor and a Proctor V—have been sold.

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HERTS and ESSEX AERO CLUB, Broxbourne Aerodrome, Nazeing, Essex. M.A.C. approved 30-hour course; solo flying from 30/- per hour; residential trial lessons 35/-; train from Liverpool Street, or Green Line Coach 715.—Tel.: Hoddesdon 2563, 2421, 3705. [0330]

CONSULTANTS

WING COMMANDER R. H. STOCKEN, F.R.Ae.S., Eagle House, 109, Jermyn St., London, S.W.1. Tel.: Whitehall 8863. [0419]

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A HOTEL "permeated with the atmosphere of happiness, courtesy and willing service." Adjoining sandy beach. Children's nursery. Cocktail bar. Dancing. Five to 11 gns. inclusive. Brochure with pleasure.—Chalet Hotel and Country Club, Winterton-on-Sea, Norfolk. [7813]

INSURANCE

ALL types of aircraft insurance and personal accident cover.—Apply to J. W. T. Amey, Messrs. R. J. Moffat and Co., Percy House, 706, High Rd., Tottenham, N.17. Tel.: Tottenham 2003-4-5. [0504]

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PUBLIC ANNOUNCEMENT

COUNTY BOROUGH OF SOUTHEND-ON-SEA

SOUTHEND MUNICIPAL AIRPORT

OFFERS are invited from aircraft operating companies for the rights, under licence, to provide for flights at the Municipal Airport as from April 1st next.

FORMS of offer, containing particulars of the conditions upon which the right will be granted, are obtainable from the undersigned, and completed offers should be submitted in plain sealed envelopes endorsed "Joy Flying Rights" not later than Saturday, February 23rd, 1952.

THE Corporation do not bind themselves to accept the highest or any offer.

ARCHIBALD GLEN,
Town Clerk.

February 6, 1952. [7930]

TIME RECORDERS

TIME recorders service rental. Tel.: Hop. 2230. Time Recorder Supply and Maintenance Co., Ltd., 187-189, Borough High Street, S.E.1. [7363]

STAFF item checking and job-costing time recorders (all makes) for quick cash sale; exceptional conditions.—Box 7941. [0040]

TUITION

LEARN to fly for £56; instructors' licences and instrument flying to £3 an hour; night flying £3.10/- an hour; residence 4½ gns. weekly. Approved M.C.A. private pilot's licence course.—Wiltshire School of Flying Ltd., Thruxton Aerodrome, Andover, Hants. [7953]

A.F.R.Ae.S., A.R.B.Certs., A.M.I.Mech.E., etc., on "no pass, no fee" terms; over 95% successes. For details of exams. and courses in all branches of aeronautical work; navigation, mechanical eng., etc., write for 144-page handbook free.—B.I.E.T. (Dept. 702), 17, Stratford Place, London, W.1. [0727]

FREE! Brochure giving details of courses in all branches of aero eng. covering A.F.R.Ae.S., M.C.A., exams., etc. We are the only postal training college operated by an industrial organisation.—Write to E.M.I. Institutes, Postal Division, Dept. F36, 43 Grove Park Road, London, W.4. Tel.: Chiswick 4417. (Associated with H.M.V.) [0926

SCHOOL OF NAVIGATION, University College, Southampton. Flight navigator's course £16/10/- for six months' tuition; pilot licences, £7/10/- to £13/10/- for six months' tuition; Link instruction; all approach systems, 10/- per hour or £5/10/- for ten hours; postal courses; all of residence. Tel.: Locks Heath 2161. [0567]

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WHITE WALTHAM
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Bovingdon 2296 *Extension 14*

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COLLEGE OF AERONAUTICAL AND AUTOMOBILE ENGINEERING, Chelsea and Redhill Aerodrome. Diploma course in aeronautical engineering combine full day workshop and technical training with coaching for R.Ae.S. Associate Fellowship examination. Parts 1 and 2 aircraft engineers, licences, etc., in preparation for executive positions. Syllabus from the College Secretary, Sydney Street, Chelsea, S.W.3. Tel.: Flaxman 0031. [0019

SITUATIONS VACANT

THE DE HAVILLAND AIRCRAFT CO. LTD.,

HAVE VACANCIES FOR

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PREFERABLY WITH AIRCRAFT EXPERIENCE IN THEIR HATFIELD AND LONDON (REGENT STREET) OFFICES

Applications, stating age, experience and salary required to

CHIEF DRAUGHTSMAN
THE DE HAVILLAND AIRCRAFT CO. LTD.,
HATFIELD, HERTS [0031

LARGE AIRCRAFT MANUFACTURING COMPANY

NORTH-EAST OF ENGLAND

offer the following vacancies:—

(1) ASSISTANT CHIEF PRODUCTION ENGINEER required for aircraft and aircraft engine projects. Applicant must be thoroughly conversant with processing, rate-fixing, jig and tool designing, planning, etc., with full ability to control the above departments. Age preferably 30-40.—Box F.787.

(2) ASSISTANT CHIEF PROCESSING RATE FIXER and PLANNING ENGINEER required for aircraft and aircraft engine manufacture. Age 30-40.—Box F.788.

(3) ASSISTANT CHIEF FOR JIG AND TOOL DESIGN DEPARTMENT. Experience of aero engine and aircraft manufacture desirable, but not essential.—Box F.789.

(4) ASSISTANT MACHINE SHOP SUPERINTENDENT wanted. Experience on production of aircraft and/or aircraft engines essential.—Box F.790.

(5) SENIOR DRAUGHTSMEN, STRESSMEN and LOFTSMEN, with sound knowledge of and experience on all-metal aircraft.—Box F.791.

Applicants, who must be British, should write, giving full details of their age, experience and qualifications, quoting the appropriate Box No., to 191, Gresham House, E.C.2. [7909

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SENIOR, INTERMEDIATE AND JUNIOR (OVER 23)

required by

SHORT BROS. AND HARLAND, LTD.

IN THEIR AIRCRAFT DRAWING OFFICE, BELFAST

(preferably with aircraft experience).

Applications, stating age, experience and salary required, to:

CHIEF DRAUGHTSMAN,
SHORT BROS. AND HARLAND, LTD.
QUEEN'S ISLAND BELFAST. [7913

NAVAL AVIATION

YOUNG men between 17 years and 24 years are required for short service commissions in the ROYAL NAVY for eight years' flying duty as pilots or observers. It is intended that up to 30 per cent of those completing the engagement shall, if suitable, be given permanent commissions. The remainder will pass to the Reserve for seven years and be paid a tax-free gratuity of £1,500. Applicants must have School Certificate with a pass in mathematics or a General Certificate of Education with passes at ordinary level in English language, mathematics and one other subject, all taken at one sitting, or equivalent educational qualifications, and be physically fit.

Write to Secretary of the Admiralty (C.W.520 F.), Queen Anne's Mansions, London, S.W.1. [7885

JUNIOR DEVELOPMENT ENGINEERS

FOR WORK ON STRUCTURE, ELECTRO-HYDRAULIC ACCESSORIES OR HYDRAULICS required on work of national importance. Applicants should preferably be of degree standard, but those having some experience on the above lines would be acceptable. PLEASE apply in writing, giving full details, to the

PERSONAL MANAGER,
DE HAVILLAND PROPELLERS, LTD.,
Manor Road, Hatfield, Herts. [7906

ELECTRICAL DRAUGHTSMAN

VACANCY for keen man, with sound experience of aircraft circuits and cabling desirable, but not essential. Canteen, welfare and sports club. Single accommodation can be arranged.—Applicants, who must be British subjects, should please write, giving age and full particulars of training and experience, to:—

THE PERSONNEL SUPERINTENDENT,
BLACKBURN AND GENERAL AIRCRAFT, LIMITED,
BROUGH, EAST YORKS. [7899

SITUATIONS VACANT

THE DE HAVILLAND AIRCRAFT Co., Ltd., Christchurch, Hampshire, have vacancies for the following personnel:—

SENIOR AERODYNAMICISTS
JUNIOR AERODYNAMICISTS
FLIGHT TEST OBSERVERS
SENIOR WEIGHT CONTROL ENGINEERS
JUNIOR WEIGHT CONTROL ENGINEERS

APPLY in writing, stating age, experience, and salary required, to Personnel Manager, at the above address. [7630]

STRESSMEN (Junior and Senior),
also
WEIGHTS ENGINEERS
required by
SHORT BROTHERS AND HARLAND, LTD.
Applications, stating age, experience and qualifications, to:—
PERSONNEL MANAGER,
SHORT BROTHERS AND HARLAND, LTD.,
QUEEN'S ISLAND, BELFAST. [7673]

CIVIL SERVICE COMMISSION

(1) Naval cadetships (special entry).
(2) First appointments in the Royal Marines.
(3) Entry to the Royal Military Academy, Sandhurst.
(4) Royal Air Force Cadetships.

A COMBINED competition will be held, commencing on May 20th, 1952. A centre in Germany (British Zone) will be included in the list of centres for the written examination.

AGE limits:—

Naval cadetships (special entry), 17 years 2 months to 17 years 10 months on July 1st, 1952.
First appointments in the Royal Marines, 17 years 2 months to 18½ on July 1st, 1952.
Entry to Royal Military Academy, Sandhurst, 17½ to 18½ on July 1st, 1952.
Royal Air Force cadetships, 17½ to 19 on July 1st, 1952.

APPLICATION forms and conspectus of the competition may be obtained from the Secretary, Civil Service Commission, Burlington Gardens, London, W.1, quoting No. 1002/52. Completed application forms must be received by him by March 6th, 1952. [7669]

THE DE HAVILLAND AIRCRAFT Co.Ltd., Christchurch, Hampshire, have vacancies for the following:—

SENIOR method engineers with experience in machine shop, sheet metal or fitting shop.
SENIOR and junior jig and tool draughtsmen, preferably with experience of assembly jigs as well as small tools.

APPLY in writing to the Personnel Manager, stating age, experience and salary required. [7623]

YOUNG, keen draughtsmen wanted for aircraft structural work.
TILTMAN LANGLEY LABORATORIES, Redhill Aerodrome, Surrey. [7631]

AIRCRAFT radio mechanic required, preferably but not essentially experienced on v.h.f. equipment.—Apply: Airwork, Ltd., R.N.A.S., St. Davids, Pembs, S. Wales. [7689]

THE Aircraft Design Technical Office requires the following personnel for work on an interesting range of civil and military aircraft and helicopters:—

JUNIOR and intermediate technicians for aircraft structural analysis. Engineering degree or Higher National Certificate, preferably with aircraft stressing experience.

JUNIOR and intermediate technicians for Engineering Development Aircraft Laboratory. Higher National Certificate and preferably with experience of structural or general engineering test work.

JUNIOR and intermediate weights assistants, with National or Higher National Certificate in Engineering and some experience in an aircraft weights section or drawing office.

PROGRESSIVE appointments with good opportunities for advancement on merit.

EXCELLENT working conditions, welfare and sports facilities. Opportunity exists to join subsidised private flying club.

APPLICANTS should state age and give full details of all qualifications and experience to The Personnel Manager, The Bristol Aeroplane Co., Ltd., Aircraft Division, Filton House, Bristol. [7704]

ELECTRONIC engineer with good academic qualifications and practical experience required for development work on vibration pick-ups and associated equipment in South Bedfordshire area.

APPLY, stating age, experience, qualifications and salary required, to Box 6863, quoting reference S.4. [7702]

AIRCRAFT or mechanical draughtsmen required, all grades, for appointment at Langley Offices.—Apply in first instance, stating age, experience and salary required, to:—

THE Chief Draughtsman, Alan Munts and Co., Ltd., (Aircraft Section), Heston Airport, Hounslow, Middlesex. [7650]

JIG and tool draughtsmen required, fully experienced.—Applications, in writing, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds., stating age, experience and salary required. [7693]

LICENSED radio engineer and radio mechanics at our base at Stansted Airport, Essex.—Apply by letter or telephone, to the Senior Radio Engineer, Aviation Traders Ltd., Southend Airport, Essex. Tel.: Rochford 50491. [7686]

APPLICATIONS are invited from design draughtsmen and stressmen; also technical assistants with combined design and performance experience for work on both reciprocating and gas turbine aero engines.

APPLICATIONS should state full particulars of experience and qualifications, and should be addressed to The Personnel Manager, The de Havilland Engine Co., Ltd., Stonegrove, Edgware, Middx. [7676]

DEVELOPMENT engineers with experience on problems involving thermodynamic and mechanical considerations, for work on aircraft heating installations.—Write, stating details of age, training and experience, to Box 6730. [7667]

AIRWORK, Ltd., Usworth Aerodrome, Castletown, Co. Durham, require navigation instructors for air and ground duties. Desirable qualifications, staff navigator course and instructing experience.—Apply, the Manager. [7678]

DEPUTY chief inspector required for service in Karachi with an aircraft repair and overhaul company. Salary Rupees 1,400 per month; 3-year contract with 4 months U.K. leave on conclusion.—Apply: Overseas Division, Airwork, Ltd., Sutton Lane, Langley, Bucks. [7676]

AIRCRAFT senior draughtsmen required for interesting programme of development work. Excellent conditions and attractive rates for the right man.—Write, giving details of age and experience, to the Personnel Manager, Helliwells, Ltd., The Airport, Walsall. [7677]

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SITUATIONS VACANT

AIRCRAFT fitter assemblers required by de Havilland Aircraft Co., Hatfield. Good working conditions, modern equipment, superannuation scheme, opportunities for advancement.—Apply in person or by letter to Personnel Manager, or telephone Hatfield 2345. [6930]

TECHNICAL authors and illustrators required. Knowledge of M.o.S. procedure desirable.—Applications, in writing, stating age, experience and salary required, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds. [7694]

WEIGHT estimator required for work on fixed wing and helicopter aircraft.—Apply, giving details of age, qualifications, experience and salary required to: Personnel Manager, Percival Aircraft, Ltd., The Airport, Luton, Beds. [7695]

SENIOR and junior weight engineers required. Interesting work on new projects. Permanent positions offered to suitable applicants.—Apply, stating age, experience, qualifications and salary required, to Chief Designer, Gloster Aircraft Co., Ltd., Witcombe, Glos. [7695]

TECHNICAL illustrator required to prepare service manuals for aeroplane landing gear and hydraulic units. Youth and comparative inexperience not a disadvantage if compensated for by interest and a knowledge of projection.

WRITE personally to Mr. J. R. Smith, Chief Publicity Department, British Messier, Ltd., Cheltenham Road East, Gloucester. [7632]

GLOSTER AIRCRAFT Co., Ltd., have vacancies for fully experienced aircraft structural and electrical draughtsmen.—Applications, in writing, stating age, experience and salary required, to Employment Officer, Gloster Aircraft Co., Ltd., Hucclecote, Glos. [7691]

JUNIOR draughtsman required, S.E. London area, with experience of design and development of aircraft instrument mechanism.—Applicants should write, stating age, salary expected, with details of experience, to Box F.949 at 191, Gresham House, E.C.2. [7694]

SENIOR designer draughtsman required, S.E. London area, with experience of design and development of aircraft instrument mechanisms.—Applicants should write, stating age and salary expected, with details of experience, to Box F.950 at 191, Gresham House, E.C.2. [7695]

JUNIOR aerodynamicist required. Preferably with Higher National Certificate and with some previous experience in similar capacity.—Applications, in writing, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds., stating age, experience and salary required. [7691]

AIR SCHOOLS, Ltd., Derby Airport, have vacancies for a qualified flying instructor holding a minimum R.A.F. B.1. category, and a staff pilot preferably with Anson experience.—Apply, stating experience, etc., to the Chief Instructor, Derby Airport, Burnaston, Nr. Derby. [7686]

VACANCIES for draughtsmen and stressmen exist in the Saunders-Roe Helicopter Division at Eastleigh, near Southampton.—Interested persons should apply, stating age, experience, qualifications, salary required, etc., to the Personnel Officer, Saunders-Roe, Ltd., East Cowes, Isle of Wight. [7690]

AIRWORK GENERAL TRADING Co., Ltd., Blackbushe Airport, near Camberley, Surrey, urgently require engine fitters, electricians and instrument mechanics for maintenance of Viking, Dakota and Hermes aircraft. Rate 3/7d. per hour for 44-hour week, plus overtime. Canteen facilities available.

A LMD required are licensed aircraft engineers with experience on Hermes aircraft and radio mechanics holding current "B" licences. Pay according to qualifications.

APPLICATIONS, in person or in writing, to the Service Manager. [7646]

APPLICATIONS are invited from senior and intermediate design draughtsmen; experience of aero engine design desirable but not essential.—Please write, stating age and giving details of previous experience in chronological order, to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middx. [7649]

PLANNING engineers (aircraft) required. Considerable production planning experience and sound knowledge of metal airframe components manufacture essential. Applications, in writing, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Beds., stating age, experience and salary required. [7696]

THE FAIREY AVIATION Co., Ltd., require a number of senior aerodynamicists for varied work on all types of aircraft. The prospects of advancement are good for capable applicants.—Full details of previous career, qualifications, salary, etc., to the Personnel Manager, Hayes, Middlesex, quoting reference AL/1. [7684]

SENIOR test engineers, of at least Higher National Certificate standard, required for the development of aircraft hydraulic systems and components.—Write, giving details of age, experience and salary required, to the Chief Test Engineer, British Messier, Ltd., Cheltenham Road East, Gloucester. [7617]

ONE male test laboratory assistant required. National Certificate standard and preferably 2-3 years' experience on design and analysis of mechanical tests.—Applications, in writing, stating age, experience and salary required, to Personnel Manager, Percival Aircraft, Ltd., The Airport, Luton, Beds. [7697]

H. M. HOBSON, Ltd., invite applications for positions in the drawing office as follows: Designers, detail and modification draughtsmen, checkers, stressmen. The work is concerned with interesting projects connected with fuel metering equipment and hydraulic flying controls for aircraft.—Hobson Works, Fordhouses, Wolverhampton. [7640]

EXPERIENCED stressman required for responsible position in stress office. Minimum requirements B.Sc. (or equivalent), several years' experience, ability to take charge of stressing of complete aircraft.—Applications, in writing to Personnel Manager, Percival Aircraft, Ltd., The Airport, Luton, Beds., giving details of training, experience, age and salary required. [7656]

DESIGNER-DRAUGHTSMAN for aircraft installation commercial projects. Applicant should have sound engineering background. Experience in the fabrication of light-alloy components for both prototype and production an advantage.—Write, giving details of age and experience, to Chief Draughtsman, Delaney Gallay, Ltd., Edgware Road, Cricklewood, N.W.2. [7687]

SENIOR designer for aero-engine gas turbine project design required in well-known firm in London area. Previous experience on mechanical design is essential. Good prospects of promotion for a suitably experienced and enterprising candidate.—Please write, giving full details of age, experience, qualifications and salary required, quoting ref. ACJ, to Box 6855. [7709]

A BRITISH company operating in the Middle East require, in the summer of 1952, a pilot with a commercial pilot's licence endorsed for light aircraft. Preference will be given to candidates who are single. Salary will be in accordance with qualifications and experience. —Applications in writing, giving full details of qualifications and experience, to Box 6858. [7698]

SITUATIONS VACANT

DRAUGHTSMEN are required by a well-known engineering company for employment in the London area. There are vacancies for men to work on aero engine detailing and design, test plant design and gas turbine blade design. These are permanent pensionable positions carrying good salaries and prospects.—Applications, quoting ASE, to Box 6888. [7642]

AIR FORCE. Naval, civil and helicopter aircraft, all under design and development at Percival Aircraft, Ltd. Applications are invited from senior and junior draughtsmen, and stressmen for work on this interesting programme.—Write, giving details of experience and salary required, to Personnel Manager, Percival Aircraft, Ltd., Luton Airport, Luton, Beds. [6898]

THE GLOSTER AIRCRAFT Co., requires senior and intermediate stressmen to work on designs and projects of advanced interest. Excellent prospects of advancement for sound and energetic men.—Apply in the first instance, giving full particulars of technical qualifications, age, experience and salary required, to The Chief Designer, Gloster Aircraft Co., Ltd., Hucclecote, Glos. [6911]

JIG and tool draughtsmen (age 25-35) required by manufacturers of automobile and aircraft components in South Midlands. Practical experience in toolroom and production shops, and good technical qualifications essential. Salary according to ability. Single lodging accommodation available. State salary, age and full particulars.—Box 6790. [7390]

DESIGNER draughtsmen required by Lockheed Hydraulic Brake Co., Ltd., Leamington Spa. Should be fully experienced in light mechanical engineering. Knowledge of hydraulics an advantage. Opportunity for early promotion to section leader grade on proof of ability. Single hostel accommodation available.—Write to Personnel Officer, giving full particulars of salary, age and experience. [7141]

A PROJECT engineer is required by a well-known firm of instrument makers, to direct the work of a section responsible for the layout and installation of specialised electronic equipment in aircraft. Applicants should be qualified electrical engineers, having had experience in and enthusiasm for, this kind of work.—They are asked to send full particulars of experience and training, starting salary required, to reference PR, Box 6831. [7076

LABORATORY assistant required for the development of electric motors and generators in the electrical laboratory of The Plessey Co., Ltd. Applicants must possess engineering degree or Higher National Certificate or their equivalent, and should be about 25 years of age.—Applications should be made in writing, stating full particulars, to the Personnel Manager, The Plessey Co., Ltd., Ilford, Essex. [7078

MECHANICAL design draughtsman required by The Plessey Co., Ltd. Applicants should have had experience in the mechanical design of rotating electrical machines, should be at least 26 years of age, and should possess the Higher National Certificate. The usual staff privileges are available to the successful applicant. Kindly state full details to the Personnel Manager, The Plessey Co., Ltd., Ilford, Essex. [7087

TECHNICAL author required by manufacturers of aircraft components. Experience in preparation of publications to M.o.S. and A.I.B. standards. Applicants with suitable qualifications would be considered for training. Over 25 years of age.—Write, stating experience and salary required, to the Personnel Officer, The Godfrey and Partners, Ltd., Hampton Road, Hanworth, Middlesex. [7674

TECHNICAL assistants, both junior and senior, required in mechanical engineering department of work of national importance in connection with development of gas turbine engines. Excellent prospects exist in sections dealing with rig test of engine components, vibration, static structure test and research in gears and bearings. Qualifications: degree or H.N.C.—Apply: Reference No. VI, Armstrong Siddeley Motors, Ltd., Coventry. [6902

MANAGER required for sub-contract department in large aircraft factory in south-west to control nation-wide sub-contracting of all types of machining, sheet metal and assembly work. Sound engineering training, previous experience in aircraft sub-contracting, and ability to organise and control staff are essential qualifications. Good salary and prospects for suitable man.—Write, Box 1,657, A.K. Advg., 11a Shaftesbury Avenue, London, W.C.2. [7639

SITUATIONS VACANT

ARMSTRONG SIDDELEY MOTORS have a few vacancies for senior and junior stressmen to do work on strength investigations and calculations on gas turbine aero engines. Degree, Higher National Certificate or equivalent essential. This is work of prime national importance. There are also a few vacancies for senior and junior stressmen for work on the installation of gas turbines in aircraft.—Apply in some detail to Reference SJS.1. [6909

TEST assistants, both junior and senior, are required for an interesting programme of structural testing. Juniors should hold Ordinary National Certificate and have preferably had some experience in this type of work. Seniors should have Higher National Certificate or its equivalent and a minimum of 2 years' experience in test work.—Apply, giving details of training and experience, to the Personnel Manager, Boulton Paul Aircraft, Ltd., Wolverhampton. [7694

INTERNATIONAL AERADIO, Ltd., offers careers to experienced air traffic control officers at overseas airports. Basic salary starting at £600 and rising to £900 p.a., plus adequate overseas allowances to cover local conditions, free air passages for staff and families. Single pilots and navigators will be considered. Local paid leave annually, and paid U.K. leave every 2/3 years. Pensions and insurance fund. Kit allowance.—Write: Personnel Officer, 45, Park Street, London, W.1. [7695

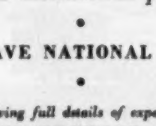
THE GLOSTER AIRCRAFT Co. requires the services of a number of aerodynamicists (a) for design and project work, and (b) for flight test reduction. Opportunity exists for individuals to vary their experience within the Aerodynamics Department. Candidates with some years' experience preferred, but applications from juniors with sound mathematical ability will receive full consideration. —Apply, in the first instance, giving full particulars of age, experience and salary required, to The Chief Designer, Gloster Aircraft Co., Ltd., Hucclecote, Glos. [7015

THE following are required for an expanding programme of new work on aircraft engines: Three senior stressmen with experience of light alloy construction; one section leader design draughtsman for engine, fuel system and equipment installation work; one leading draughtsman for modification work; one senior draughtsman to be responsible for dealing with works queries; one senior weight estimator capable of estimating project weights; one technical author for civil and military handbooks.

ALL the above personnel, with the exception of the technical author, should preferably hold at least the Higher National Certificate in Engineering, but consideration will be given to other applicants with lower qualifications.—Applications for all posts should be made in writing, stating age, experience, qualifications, salary expected and details of the type of accommodation which would be required in the Leicester area. All applications to Chief Designer, Auster Aircraft, Ltd., Rearsby Aerodrome, Leicester. [7091

SERVICE engineer required having good knowledge of reciprocating aircraft engines and reasonable knowledge of electronic practice. Preference will be given to applicants with experience of electronic engine performance analysis. Successful applicant will be required to travel in U.K. and Continent. Salary commensurate with qualifications and experience, but not less than £650 p.a. Superannuation scheme.—Apply, with full details of age, experience and salary required, to the Personnel Manager, Sperry Gyroscope Co., Ltd., Great West Road, Brentford, Middlesex. [7630

AIRCRAFT SPRING WASHERS



CROSS MFG. (1939) LTD., COMBE DOWN, BATH

SITUATIONS VACANT

ASSISTANT to the chief planning engineer required. Applicants must have a sound knowledge of aircraft production methods and the post will also involve statistical work in connection with shop loading. Candidates must have served an engineering apprenticeship and have received some technical education, preferably to H.N.C. standard. They must also have had subsequent experience in aircraft planning and rate-fixing.—Applications should be made to the Personnel Manager, Folland Aircraft, Ltd., Hamble, Southampton. [7648

HANDLEY PAGE (Reading), Ltd., have the following vacancies in their design office:—A senior stressman is required; must have good experience and a degree or Higher National Certificate with endorsements in aeronautical subjects. Also required are senior and intermediate draughtsmen with aircraft experience. The positions are progressive and offer excellent opportunities for the right men. Please send full particulars to The Personnel Officer, Handley Page (Reading), Ltd., The Aerodrome, Woodley, Reading, Berks. [7074

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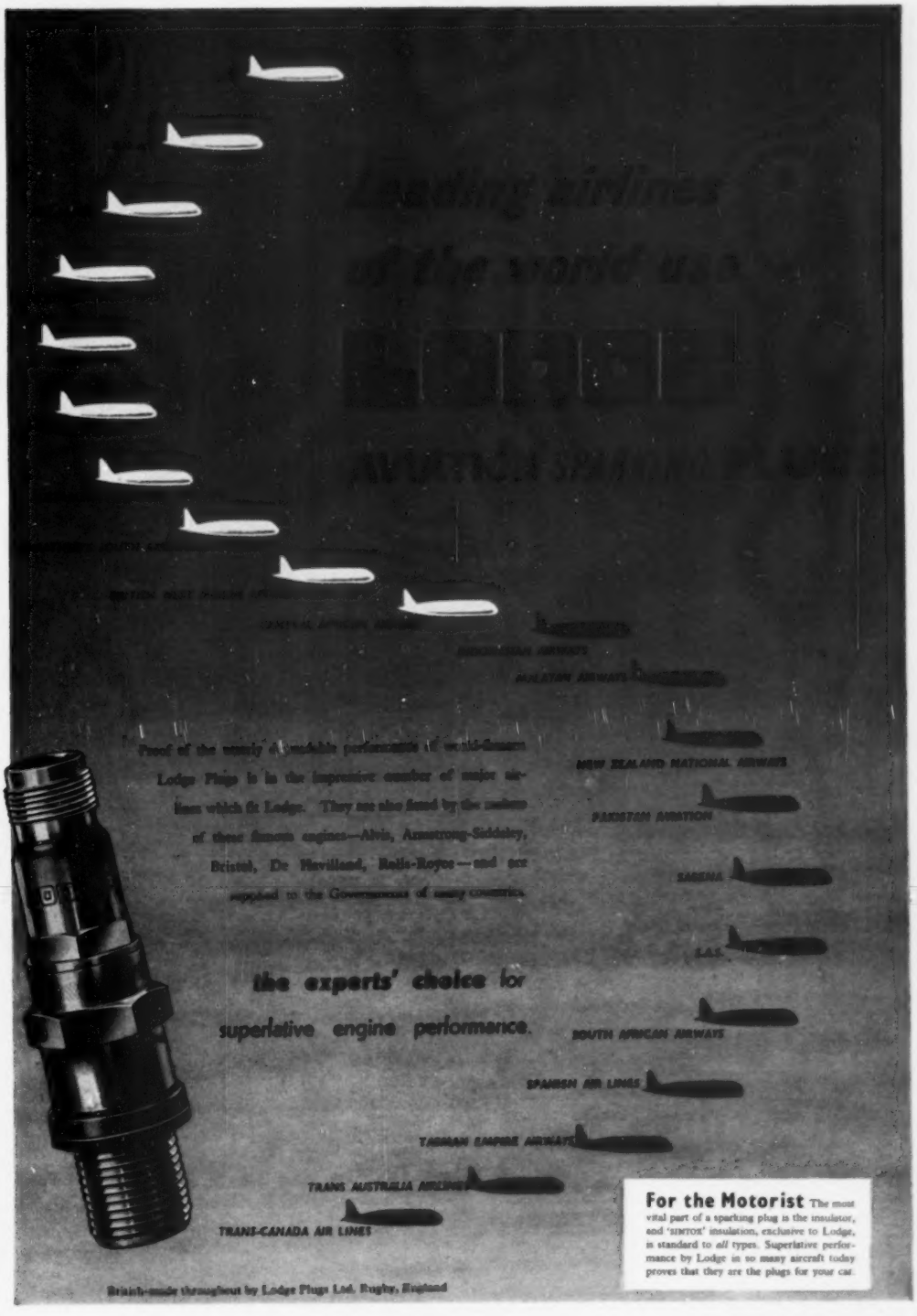
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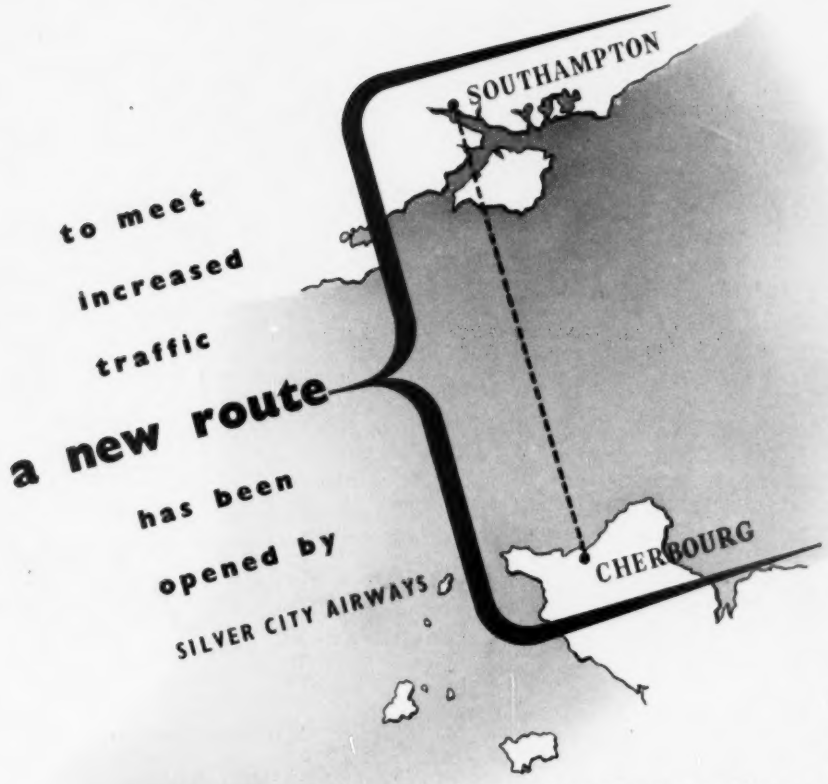

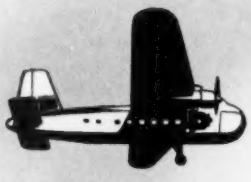

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